March 1, 1965

NOTES 3-1-65 BELEW

J-2 ENGINE

A team of four MSFC people, two from QUAL and two from EPO, are going to Rocketdyne this week to monitor and assess post hot-fire acceptance of the first two flight engines for the S-IVB stage (SA-201 and 202 - now undergoing acceptance firings). Their mission is to generate a meaningful post hot-fire checkout and minimize the time required to conduct it.

RL10 ENGINE

A total of 117 firings totaling 17,899 seconds has been accomplished on four active A-3-3 engines. The fifth A-3-3 engine is scheduled to complete build this week.

In support of AC-4 post flight analysis, testing has been conducted on E-5 to investigate the effect of recirculation on boost pump performance.

F-1 ENGINE

The outer radial baffle erosion encountered during acceptance testing of engine F-3011 (reference notes of 2-1-65) resulted from lack of braze between the baffle and the injector. Apparently the poor braze permitted fuel to collect under the baffle at cut off on the first acceptance test. When the LOX lead came into the chamber in the second acceptance test, the trapped fuel ignited and eroded the baffle. Corrective action is being taken by Rocketdyne.

Current contractor retrofit schedules for GG injectors, heat exchangers, and interface panels indicate no test schedule impact for T-bird.

C-1 ENGINE

Negotiations for Phase I have been completed with STL and RMD. It is planned that contracts will be consummated March 1, 1965.

H-1 ENGINE

All engines for SA-204 and both 200K qualification engines were delivered in the month of February. The 200K qualification program has been initiated and projected completion date remains April 30, 1965.

NOTES 3-1-65 CLINE

1. S-IC-T COMPONENT QUALIFICATION STATUS REPORTED: In an effort to meet the S-IC-T firing data, "work-around" methods have been employed, which temporarily eliminate the requirement for qualification of 36 components. At present, 26 components remain unqualified. Review of 77 component specifications and test procedures is underway to determine:

(a) Condition and confidence level of vehicle-installed and undelivered components, and

(b) If additional "work-around" methods are necessary to meet schedules.

Completion of review was scheduled for 5-1-65; however, this early date assumed the immediate full-time utilization of three personnel from Industrial Operations. Two reported late; the third has not reported. Completion date will slip accordingly.

2. ATLAS 60K SUSTAINER ENGINE (S-4) TEST FIRED SUCCESSFULLY WITH FLOX: Rocketdyne, under contract to Lewis Research Center, conducted two 15-second (programmed) runs without hardware damage. Run parameters were:

Thrust: Approximately 60K

M/R: 2.55 actual, 2.44 sea level correction (nominal M/R with LOX is 2.27)

% Fluorine: 31.9

Specific impulse increase over LOX system was 12 to 14 seconds.

3. LH_2 EXPERIMENT: The decision has been made to fly two high-rate TV cameras instead of the one high-rate and one low-rate camera on the LH_2 experiment. Advantages of this change appear to outweigh by far the disadvantages. The primary advantage lies in a much higher confidence level of meeting the schedule, with only possible loss of some secondary type data. Mission primary objectives are unaffected.

NOTES 3/1/65 CONSTAN

1. LOCAL HOLIDAY

Tuesday, March 2, is Mardi Gras Day and all contractors except Boeing are planning not to work full force. NASA personnel are encouraged to make maximum use of annual leave.

2. S-IC PROGRAM

A new description of the S-IC-D vehicle will be presented to NASA personnel on March 10. This description will include all recently agreed upon changes and deletions reached in the last few months.

S-IC-F - Boeing will present to MSFC about March 5, a new description of the configuration of S-IC-F per their agreements and discussions with KSC personnel. Most noteworthy change to be presented is the deletion of automatic checkout requirements and this deletion will require MSFC concurrence.

S-IC-T - All instrumentation for the "T" vehicle have been shipped to Huntsville with one exception. The fuel slosh electronics is the only remaining hardware that is planned to be shipped directly from the vendor by March 1.

"D" Vehicle Hardware - "D" forward skirt is 90% structurally complete. Intertank is complete. "D" fuel tank is complete. "D" LOX bulkheads welded to "Y" ring and skin.

"F" Vehicle - Bulkheads complete and tank skins complete.

Tw 3/1

B 3/5

NOTES 3-1-65 DANNENBERG

1. Voyager - In an R&DO discussion some of the key laboratory people have come to the conclusion that MSFC should not enter into active competition on the Voyager payload integration. MSFC has, at this time, not the full technical depth in all disciplines nor enough time to develop it. Langley and Ames have a time advantage. ✓

Assoc B

2. In-Flight Experiments - The interest of industry in the NASA Experimentation Program appears to be on the increase as evidenced by contractor presentations (General Dynamics, General Electric, Douglas, and IBM. ✓

3. McDonnell (Utilization of Capabilities after Gemini) - Preliminary evaluation by labs of work potential for McDonnell at MSFC had no positive results. To learn more about McDonnell's capabilities without raising false hopes or "sole source" problems, Dr. Kuettner has invited Mr. Burke (Vice President) to drop in occasionally at MSFC to tell us more about their activities and capabilities. ✓

4. Ground Abort for 201, 202 - In several inter-center panels, a conflict is developing regarding MSC's capability to abort 201 or 202 by ground control on the basis of launch vehicle TM data. (201 is an open loop EDS flight.) The reliability aspect of TM data does not provide the protection against false aborts guaranteed on a manned flight through the redundant on-board systems and displays. A joint R&DO/IO meeting proposed an MSFC position: to restrict S/C abort to range safety destruct command (3 sec. intervals). This will also cover the important case of all engines out over the pad area and of slow divergence control failure. It can be handled by on-board circuitry rather than ground command. The MSFC panel chairmen will be bound by this position unless changes are negotiated on a higher level.

See Dr. v.B.'s note to Rees on subject? fw

K.D. What transpired on the basis of my note on this subject?

B 3/5

TW3 1/1

B 3/5

NOTES 3-1-65 FORTUNE

1. Negro Community Leaders to be briefed in EEO - The Mississippi Coast Association of Federal Administrators is holding a meeting next week to present the results of the recent Civil Service Commission community survey and to encourage better communications with minority group leaders from six Mississippi counties. I will be in the hospital and Henry Auter will be busy with Activation so I am asking Marion Kent to represent us in the morning session. Mack Herring and John Hilburn will participate in the afternoon. ✓ B.F. I've been hearing that from as ill. Glad's recovering? B

2. S-II-T - Activation is being rephased, adjusted, and, where possible, accelerated, in order to provide the facilities and systems necessary to conduct hot firing on the S-II-T in January, 1966. The full inpact of the S-II-T coming to MTO in October has not been determined at this time. ✓

3. File cabinet moratorium - About 1,008 file cabinets are being held up awaiting Mr. Stormy Hanson, Chief of Supply Division, NASA Headquarters, to furnish NASA's position on the file cabinet moratorium issued by President Johnson. Since we have just begun staffing MTO with government and contractor personnel we feel it mandatory to obtain the additional file cabinets necessary to properly conduct our operation. ✓ Gorman

4. Mr. Bradshaw, Comp Lab, assists Mississippi Research and Development Council - At Tuesday's meeting, in Jackson, Bradshaw helped the council in planning to computerize state financial records. ✓

Fw 3/1

NOTES 3/1/65 GEISSLER B 3/5

1. SA-9: Additional flight results: (1) retro rocket #1 did not malfunction as reported last week on the basis of a faulty measurement indication; (2) present theory explaining high Pegasus roll rate (10 deg/sec) is based on non-propulsive venting GOX impinging on Pegasus wings (sketch attached); (3) S-I engine #3 exhibited 3.5 ms duration "pop", a short duration combustion instability between ignition and 100% thrust level. This is a rare event but happened also on SA-7 at the same engine position. P&VE is leading investigations; (4) The short S-IV burning time is qualitatively explained by an 800 lb short loading and a 1.5% high mixture ratio.

2. SA-206 "LEM Alone" Mission: A meeting chaired by R-AERO, was held on February 19, 1965, to discuss the results of MSFC's technical impact study of flying the Saturn IB "LEM Alone" mission on SA-206. Results of the study indicate that the mission is technically acceptable with the exception that structurally there are small negative margins ($\approx$ 1 to 10%) in certain areas of the S-IB and S-IVB stages. An Action Item from the meeting was to determine the wind restriction or structural beef-up required to fly the mission. The minutes of the meeting are being finalized and will be distributed March 2, 1965.

NOTES 3-1-65 GRAU

B 3/5

FW 3/1

1. S-IC PROGRAM: Review of the S-IC-1 End Item Test Plan was recently completed and comments have been coordinated with Boeing. The plan is now generally acceptable. A review of GSE with Boeing indicates that the majority of hardware will be delivered during March and that software now appears to be the most critical element. ✓

2. F-1 ENGINE FUNCTIONAL TESTING: To date four S-IC-T engines and one test engine have been functionally tested. Total number of defects per engine have not increased, but the number of external leaks has increased on the last two engines. These external leaks have been due to damaged seals, misaligned flanges, porous castings, cracked welds and under torqued bolts. This type defect should have been detected during Rocketdyne's second Electro-Mechanical testing, and corrected before shipment to MSFC. These problems are being discussed with our resident personnel at Rocketdyne for quick corrective action. ✓

Lee Below comment

3. DATA COLLECTION SYSTEM INFORMATION: In answer to a task from NASA Headquarters, the Laboratory provided them a description of one of our data collection systems. The system for collection of operating time/cycles was used as an illustration. The description included procedures used at MSFC and by one stage contractor, dissemination of the information collected and some of the benefits derived from the system. NASA Headquarters also requested information on the Unsatisfactory Condition Report (UCR) and the Inspection Reporting systems for use by Mr. Webb. It is planned to provide UCR information on March 1 and Inspection Reporting information by March 8. The information will show procedures used, and a statistical breakdown of failures and discrepancies reported on the Saturn program. ✓

4. GOVERNMENT AGENCY RELATIONSHIPS: In the interest of informing and motivating government agency personnel, the NASA film entitled "Filling the Pipeline" was shown to all agency personnel at Wichita. A large number of contractor personnel were also in attendance. The favorable response received indicates that this type activity should be continued. ✓

5. CHRYSLER CORPORATION SURVEY: A survey was conducted at Chrysler Space Division, Michoud to determine their compliance with a NPC 200-2 requirement for quality program performance audits. Compliance was less than satisfactory, and it was recommended that (1) CCSD develop a schedule of audits, (2) from this schedule, determine manpower requirements and staff the audit function accordingly, and (3) to develop a more formal system to assure that followup reviews are conducted on areas found deficient. ✓

fw 3/1

NOTES 3/1/65 HAEUSSERMANN B 3/5

1. RESIDENT LABORATORY TECHNICAL REPRESENTATIVES AT DAC AND S&ID: In response to a request from I.O. for resident technical support at DAC, Huntington Beach, and S&ID, Downey, we have been trying for six months to assign a total of two or three qualified technical personnel, GS-11 or higher, to each of these two locations. We have had two employees in residence on the West Coast for some time, one full time at DAC and the other dividing his time between DAC and S&ID. The employee full time at DAC requested his transfer to KSC, effective 3/1. In addition, we have had one employee at S&ID in extended TDY status. Effective 2/26, he was reassigned to DAC to replace the employee who transferred to KSC. We are making a concerted effort to select qualified personnel to fulfill our total commitment for these two locations, but we are having extreme difficulty in finding personnel willing to accept such an assignment on a permanent basis. Mr. Kroeger gained first-hand information concerning resident support requirements while participating in the S-II Review the week of 2/8. I will be acquainting myself with the requirements this week as mentioned in Item 2. ✓

2. STEERING COMMITTEE AD HOC MEETING AT JPL: As a member of the NASA Research and Advisory Steering Committee on Inertial Sensors, I will be participating in an Ad Hoc Meeting at JPL on 3/2 and 3/3. The balance of the week, I will review the status of Astrionics related activities at S&ID and DAC, returning 3/6. ✓

NOTES 3/1/65 HEIMBURG

1. S-IVB SACTO: On 2/23 and 2/24/65, a review was made at SACTO by R&DO and IO of the status and planned operation at SACTO leading up to the delivery of S-IVB 201 to the launch site. It is our conclusion that; most serious problem is stage component part immaturity and delivery, including the engine. Some "workarounds" using S-IV parts are being used. Other lagging areas are; software for computer and facility spares (DAC problem, but we offered help where possible). Supporting elements such as basic facility, personnel, etc., do not appear to be a problem at this time. DAC is confident that automatic GSE is in good shape and their planning has been thorough. Big hurdle, Stage/GSE integration, is yet to come however. They wisely are not trying to bite off whole chunk at first but will develop sophistication as they learn. They do not have parallel manual capability as we have in S-IC automatic, so fully automatic system must be made to work.

On 2/25/65, DAC successfully completed four tests in the Engine Chilldown Program. One test indicated a severe LH_2 pump stall condition.
The next series of chilldown tests is scheduled for 3/2/65.

2. F-1 ENGINE 2007: This engine was fired for 96 seconds on Friday 2/25/65, exhibiting 30 CPS full oscillations as have other Block II Engines. Engine will get second test on 3/1/65.

3. S-II SANTA SUSANA: As of Friday, 2/26/65, three engines had been hung and installation started.

4. SATURN V HOLDDOWN ARM FAILURE: At approximately 12 noon on 2/27/65, a Saturn V holddown arm failed while being tested for stress and deflection under an upload condition. The failure of the upper link occurred when the arm had been uploaded to approximately 1,400,000 pounds. The test criteria calls for the arm to be uploaded to a maximum of 1,600,000 pounds.

The casting material of the upper link of the arm has an ultimate strength of 178,000 p.s.i. Strain gauges on the link in the vicinity of the failure indicated stresses well below this value just prior to the time of failure.

A photograph is attached showing where the failure occurred. (ATTACHED TO DR. VON BRAUN'S AND MR. WEIDNER'S COPIES ONLY.)

We are presently working with KSC and Materials Lab of P&VE to determine reason for failure.

fw 3/1

B 3/5

NOTES 3-1-65 HOELZER

Negative Report

FW 3/1

NOTES 3/1/65 JAMES

B 3/2

I FW

SA-8: S-I-8 arrived at KSC on February 28 and is being erected today. S-IV-8 arrived at KSC on February 26 and is in the hangar undergoing receiving inspection today.

PEGASUS: At a meeting at Headquarters February 24 it was agreed that the prototype would be used as a test bed for testing and implementing fixes which will be incorporated into Pegasus "B". Pegasus "B" will be completed and shipped to GE by April 5 for low level vibration in the "Z" axis and an abbreviated vacuum test. Shipment to KSC will be made by mid April. ✓

SATURN IB I. U. GROUND TEST PROGRAM: On February 19 the IU was exposed to a sinusoidal vibration input for about 5 minutes. The input level was 0. 75 g's over the 15 to 130 cps frequency range and 3 g's over the 100 to 500 cps frequency range. The following failures occurred: (1) One of the two control computer mounting pads that did not fail during the first run became unbonded; (2) The cable rack cracked apparently because of improper cable weight simulation. The above failures are being repaired and spare cables are being substiuted for the dummies previously used to simulate cable weight. Testing is expected to resume February 26. ✓

S-IVB FACILITIES CHECKOUT STAGE: The stage was installed in Beta III on February 18. Receiving inspection and out-of-position manufacturing tasks are in process. Propellant loading is expected to begin April 16, which is consistent with present schedule requirements. ✓

S-IVB BATTLESHIP TEST PROGRAM: An extended battleship testing schedule has been proposed by DAC and is currently being evaluated by MSFC. This schedule extends the battleship test period from March 31 to June 25. ✓

LBJ

S-IVB GROUND COMMAND CUTOFF FOR SA-201 and SA-202: (MRAZEK) Reference my Notes 1/18/65. A MSFC position was agreed to last week regarding a MSC request for a ground command cutoff of S-IVB. It was agreed that spacecraft separation due to an abort condition should occur only as a result of range safety destruct command for SA-201 and SA-202. This position is being coordinated with MSFC Panel Co-chairman by Dr. Kuettner and will be forwarded by IO correspondence to the MSC Apollo Program Manager.

This jibes well with what I discussed in Washington with GEM and Gilruth

See Raes/Weidner on this & B's note to them. FW

KSC/CCSD SUPPLEMENTAL AGREEMENT: The supplemental agreement between CCSD and KSC for CCSD effort at the Cape has been signed by Headquarters. A change order which leaves the stage in the hands of Chrysler has been issued to Chrysler. Chrysler Management has accepted this direction. ✓

B

(Only 1 radio link: The range safety one)

Attachment: James 1/18/65 Notes to Dr. von Braun only.

FW 3/1

NOTES 3-1-65 Koelle B 3/5

1. Phased Program Planning (PPP): Dr. Seamans has issued the draft of a procedure which will regulate the process by which new projects get underway. By and large, I am in agreement with the procedure with the exception of the following:

HHK How does E.Z Gray take that?? B

OART will be in charge of all conceptual design and early systems studies, prior to preliminary program definition. This might exclude MSFC, in the future, from the early exploratory studies under contract to industry, as OART has set up its own organization for this at Ames. The only way out is to do these studies inhouse, provided our manpower situation will allow this. We should also be aware of the fact that the leadtime for starting new projects under this procedure, if enforced, will be between 3 and 5 years.

2. Advanced Studies Manpower: During the present year the inhouse participation (man-hours charged to Project 981 - Advanced Studies MSF) have dropped from 140 direct equivalent manyears in July 1964 to 117 manyears in January 1965. These studies include all efforts spent in support of Saturn improvement, beyond present Apollo commitments, and the AES effort headed by Mr. deFries. I expect a further downward trend because of Dr. Seamans' apparent disinterest in advanced systems studies.

We have yet to get approval for all FY 65 studies (outside AES and Saturn improvement), which amount to about 10 studies, with approximately $1.6 million dollars. I expect things to get worse before they get better.

3. Manned Planetary Transportation System Study: On February 17th the final review of a study contract "Manned Mars and Venus Exploration" (NAS8-11327, formerly GD/A, now GD/Convair - Krafft Ehricke) was held here at MSFC. Representatives were present from Ames, MSC and NASA Headquarters.

This study concentrated upon mission profile and vehicle analysis, culminating in a modular vehicle design usable (with appropriate tanking and subassembly modules) for both Venus and Mars, for each year of interest. The results will be input to the Manned Planetary Mission Requirements Study (GD/Ft. Worth), which centers upon the payload.

Venus orbiting, Mars orbiting, and Mars landing missions were studied. Most of the efforts were spent upon the 450-day/30-day staytime Mars profile, using chemical and/or nuclear solid core space propulsion. For Earth launch, the availability of (improved) Saturn V or Post-Saturn was assumed. At this time, Dr. Ruppe (Technical Supervisor of this contract) offers the following main conclusions:

a. If we insist upon Saturn V as launch vehicle and chemical space propulsion, only the simplest manned flyby missions are practical;

b. With Saturn V and nuclear propulsion, some of the orbital missions become marginally practical;

c. For a Mars landing mission with an acceptable risk, both nuclear solid core propulsion and Post-Saturn vehicles are required;

d. For cost effective routine flight operations between Earth and Mars, the tools listed under c. are not sufficient.

An excellent summary is given in a 45-minute film. After some minor corrections, it will be available here in about 2 weeks. We would be happy to show it to you.

HHK I'd love to see it. I think we should also arrange for Mueller and Seamans to see it (thereafter) B

Fw 3/1

NOTES 3-1-65 KUERS B 3/5

1. Delivery of S-IC-T to Test Laboratory: After organization of special efforts, working night shifts, working every weekend, Saturdays and Sundays, borrowing 12 electricians from Boeing, and the cooperation of many people from other laboratories and The Boeing Company, we succeeded in completing the assembly of S-IC-T to a status acceptable to Mr. Heimburg. Six areas of "work around" solutions, i.e., compromise design changes because of malfunctioning valves, are not completed yet. These substitute designs of bracketry and plumbing are not complete and substitute valves are not yet available. The remaining work to be accomplished on the test stand amounts to approximately 1500 manhours for "work around" methods, plus approximately 600 manhours for work created by late CAM's for which hardware is not yet available. Delivery of these parts is under control so that this remaining work will be carried out under an orderly plan. A great number of parts and installations have been made using sketches rather than first class documentation. This means the official released drawings and parts lists do not correctly describe all details of this stage. The documentation will catch up some weeks or months later. The re-designed Lox Distributor and also the He Distributor have been installed. Also a number of unqualified and not yet qualified components--mainly valves and control devices--are installed on this stage. The biggest unqualified components are the LOX PVC's from Arrowhead which might, however, be used as they are since an identical PVC is being used on single engine tests. ✓

2. Weld Problems at DAC: A closer look at the weld problems at DAC, as requested by Col. Hall, revealed a very high rate of weld defects of approximately 1 defect of every 18" of weld in the bulkhead fabrication area. Our first quick look assessment has been confirmed. The basic tooling and welding processes are adequate and sound. A number of fine details and refinements of the techniques have not been introduced and observed. DAC welding engineers and shop management are now aware of this situation and are willing to accept our advice and recommendations. Also a systematic analysis and definition of causes of porosity defects will be introduced by DAC. Improvements will be visible in a short time. ✓

NOTES 3/1/65 MAUS

B 3/5

1. MSFC ROLE IN AES - We have reviewed the proposal for the Apollo Extension System (AES) submitted to Dr. Seamans by MSF, the Project Approval Document (PAD) for Advanced Manned Missions which includes a portion of AES, and other pertinent documents in an effort to clarify the MSFC role in the AES program. It is apparent from this review that MSFC has the responsibility for program definition of lunar surface exploration missions. MSC has responsibility for program definition for required CSM and LEM modifications and for integrating orbital experiments into the spacecraft. Accordingly, the opportunity exists for MSFC to develop payloads or experiments for earth orbital missions or lunar orbital missions.

H.M. Please show me these papers B

These items, once approved, could be developed in-house and would utilize design, test, manufacturing, checkout, etc., skills. We have had discussions with Mr. Weidner and other R&DO personnel and have recommended more active participation in proposing engineering and scientific experiments and payloads for earth orbital and lunar orbital missions. ✓

2. BOEING SURVEY - The team lead by Chris Andressen spent last week at Boeing - Michoud, to analyze the Boeing organization and management systems in order to prescribe an approach for the Manpower and Cost Survey. Boeing appears to be in much better shape than S&ID. They have completed three "Cost to Completion" exercises and have integrated these exercises into their Program Management and Cost Systems. It appears that sufficient data exists at any point in time to conduct the government survey by an audit technique. A plan for phase II of this survey is being drafted. ✓

3. INDIRECT COSTS - In reviewing the indirect costs of Boeing, S&ID and Douglas it becomes immediately apparent that indirect cost is a source of a large cost escalation and that the problem is beyond the capability of the individual stage manager or even perhaps MSFC. Two factors (1) loss of contracts or lack of new business and (2) selling expenses (under a variety of guises) are driving the indirect up by as much as $1.50 per direct manhour in certain cases. Each company employs devices to attempt to circumvent the intent of ASPR. NASA needs a policy as to how to deal with this problem. This may be an appropriate topic for the Management Council Meeting. Jack Sharkey is pulling together the facts which we plan to review with Mr. Gorman to develop a course of action.

O.K.
Get suitable package ready for
Thu 3/23 Man. Council Meeting at the Cape
B

NOTES 3-1-65 McCartney

1. SUPPORT CONTRACTOR EVALUATION BOARDS: This office has jointly developed with the Purchasing Office a system for evaluating the performance of our impending support contractors. This was reported to you in my NOTES of 2/15/65 (see attached). This system involves several Performance Evaluation Boards which will recommend to you, as Fee Determination Official, Award Fees commensurate with contractor performance. Colonel W. S. Fellows was designated this week to serve as Chairman of these Boards. This office has conferred with Colonel Fellows during the past week and briefed him on the evaluation system. Assistance will be provided him until the system becomes activated, following which this office plans to provide the permanent secretariat for all Boards. A series of initial Board meetings is now being scheduled for the week of March 8th. The purpose of these meetings is to consider and approve proposals from the laboratories and offices regarding their respective evaluation systems and to activate the evaluation system in each organization. In this connection, a memorandum has been prepared for your signature, creating these Boards and appointing members. This memo is now in the hands of Mr. Gorman.

2. SUPPORT CONTRACTOR CONFLICTS OF INTEREST: NASA policy requires that situations should be avoided which might place a company in an advantageous position with respect to a particular procurement, or which might influence a contractor to give NASA a biased judgment. NASA Headquarters desires assurance that MSFC is avoiding such situations with respect to the impending support contracts. On the other hand, NASA does not want unreasonable restraints placed on the support contractors in order to carry out this policy. Dick Cook is to present our position on this matter to Mr. Webb during his briefing on March 4th covering the support contract procurements which are being competitively negotiated. Resources Management Office has actively participated with IO and the Chief Counsel's in preparing a policy statement on this subject. Wilbur Davis and Ed Guilian carried this statement to NASA Headquarters for discussions last Thursday.

NOTES 3/1/65 RUDOLPH

1. LEM Adapter Panel Deployment - The LEM Adapter Panel Deployment problem has been resolved. MSC has agreed to a deployment angle of $45^{\circ} \pm 5^{\circ}$ which is acceptable with MSFC, since it will not cause a serious interference with the antenna radiation patterns from the IU.

2. S-IC-T Status - The installation of electrical cables on the S-IC-T has been completed. The stage is being delivered to the MSFC Test Stand ~~today~~ (1 Mar 65) as scheduled. The first single-engine firing is expected to occur no later than 1 June 65.

3. S-IC-D Fuel Tank Status - The final close-out weld on the S-IC-D Fuel Tank was completed by Boeing Michoud on 24 February 65. This is the first S-IC Fuel Tank assembled by the Boeing Company.

4. S-II Stage Common Bulkhead Test Tank Status - Circumferential welding of the LH_2 Bulkhead and the common Bulkhead to the cylinder assembly of the Common Bulkhead Test Tank has been completed. This essentially completes structural assembly of this unit, and hydrostatic testing is the next significant operation, scheduled for the week of 14 March 65.

5. Visit of Dr. Golovin to S&ID - Dr. Golovin attended the 19 February 65 NAA/S&ID Design Review of GSE Units, C7-84 Calibration Unit (Propellant Utilization System) and C7-85 Test Set (Propellant Utilization System). He seemed quite impressed at the depth presented by S&ID in their Design Reviews. He also visited the Seal Beach manufacturing activities where he expressed interest in the manufacturing processes being used, particularly those that indicate a possible break through in the State-of-the-Art. In this connection he seemed particularly interested in the controlled depth welding processes. After leaving Seal Beach, he visited Rocketdyne, where he examined F-1 and J-2 Engines which had been disassembled for audit purposes after hot firing. While at Rocketdyne, he discussed engine reliability and received a presentation on the toroidal engine.

6. Instrument Unit Engineering Order (EO) Procedure at IBM - A method of expediting emergency changes to production hardware and class I drawings (government format) has been implemented in the form of a Floor Engineering Order at IBM. This EO will be prepared and signed by the cognizant MSFC laboratory representative that is on call to support the Resident Office. A follow up formal MSFC EO will be released through normal controls reflecting the exact information from the Floor EO that allowed IBM to proceed.

Shepherd Fw 3/1

NOTES-3-1-65-SHEPHERD B 3/5

Boeing Space: On February 26, 1965, George Stoner et al, of Boeing made a presentation to Messrs. Gorman, Shepherd and Col. Hirsch on proposed 100,000 sq. ft. building in the Huntsville Industrial Park, It will be a two-story double affair joined by a single story lobby. Cost estimates are - main building $1,900,000, powerhouse and plant services $475,000, site work $575,000, land $180,000 and equipment $350,000, totaling $3,480,000. Boeing will formalize its building proposals in writing Tuesday or Wednesday of this week. In the meantime, Boeing will begin to pick up additional HIC space immediately and will have available for occupancy 71,726 sq. ft. which NASA will have released by August 1965. Boeing plans to release the Blue Springs and Twickenham space by September 1965. At that time Boeing will occupy a total of 344,600 sq. ft. of HIC space. When Boeing's new building is occupied in the summer of 1966, they will continue to occupy 302,834 sq. ft. of HIC space and will release 41,766 sq. ft. MSFC will release an additional 58,000 sq. ft. of HIC space by January 1966. This will make about 100,000 sq. ft. available for smaller or shorter range contractors. We are studying availability of other space which may be released at the HIC as other contractors build facilities in Huntsville. ✓

Shep Amorti-zation period? 15 yrs? 20 yrs? B

The R&A Program approval authority permits us to perform from AO or R&D funds as appropriate:

a. Repairs and Alterations and Expansions up to - $150,000

b. Minor New Construction up to - $75,000

This fiscal year we plan to do 35 R&D funded projects totaling $2,202.0 and 21 AO funded projects totaling $870.0. This program is a very vital one to us. A few examples of recently accomplished projects are (1) modification of Building 4373 for the Electrical Support Equipment for Saturn V GSE and (2) modification of Building 4708 for the Saturn V Bread-board Facility and S-IC Checkout.

Attached is a listing of the approved FY-65 R&A Program. ✓

1 Attachment

NOTES 3-1-65 Stuhlinger

1. PROJECT PEGASUS: Pegasus A continued to give very good data. Initial inconsistencies between Satellite and ground timers could be resolved satisfactorily. The body motion (roll and precession) changes slowly as anticipated. There is no reason to expect unduly high forces because of this motion. All of our data are still from SATCON at KSC, and Green Mountain at MSFC. No data tapes from GSFC were received so far. Cooperation from KSC (SATCON), Astrionics (Green Mountain), and Computation Lab is excellent and extremely valuable.

A contract with Fairchild-Hiller for Systems Analysis Support ($60,000) is being negotiated. It will secure F-H'S continuing support in the system and data evaluation after expiration of the main contract.

2. AES: Three of RPL'S Scientific Mission Studies are being processed for RFQ'S; the rest have been approved principally by OART, and funding authorization is expected shortly. It seems that OART is far more willing to concur with OSSA'S and MSFC'S plans in the scientific mission and instrumentation area, than in the surface mobility area.

3. LUNAR SCIENCE SYMPOSIUM: This symposium is now planned for April 6, 7 and possibly 8. Bill Taylor's group in MSF will organize the meeting, while MSFC (specifically RPL) will serve as host. There is a possibility that Vice President H. Humphrey will come here to address the symposium (PAO is in contact with MSF).

4. FIRST RESEARCH ACHIEVEMENTS REVIEW: The first Research Achievements Review was held February 25 in the Morris Auditorium. Speakers were Dr. R. Shelton on Radiation Physics and Mr. G. Heller on Thermophysics. Both talks revealed considerable research activities at MSFC. There were about 90 attendants. Mr. Weidner and Dr. Geissler were the only representatives of MSFC management and staff. Proceedings of the Review will be published within a few weeks.

5. STATUS OF MSFC SUPPORTING RESEARCH & DEVELOPMENT PROGRAM:

	ANNUAL PLAN	AUTHORIZED	PROCESSED TO FMO	OBLIGATED BY P&C
OART Total	14,062,000	12,549,000	9,228,264	3,164,727
MSF	19,000,000	15,000,000	14,152,319	274,377
OSSA	827,000	827,000	426,950	1,485
OTDA	1,925,000	1,925,000	1,110,392	927,585
TOTAL	35,814,000	30,301,000	24,917,925	4,368,174

Obligation rate, averaged over the last two weeks, was approximately $150,000 per week. This rate must be increased considerably if our SR&T Program is to be obligated by the end of the fiscal year.

March 8, 1965

Fw 3/8

B 3/11

NOTES 3-8-65 BELEW

C-1 ENGINE

The two contracts for Phase I were approved March 5, 1965.

GEMINI ENGINE FOR S-IVB STAGE

Formal qualification testing at MSFC is still scheduled to begin this week.

J-2 ENGINE

The engine for SA-201 has completed hot-firing acceptance test and is currently undergoing an intensive post test checkout. Four people from R-QUAL and two from the Engine Program Office are at Rocketdyne following this engine through checkout in an effort to expedite its delivery.

The engine for SA-202 is currently undergoing hot-fire acceptance testing.

Engine 2007, a spare for the S-II Battleship program, was delivered last week. The first engine for the S-II All Systems vehicle is currently undergoing post hot-fire checkout.

RL10 ENGINE

The procurement plan for the RL10 follow-on R&D Incentive Contract for the period October 1, 1965, thru September 30, 1967, has been in Headquarters since January 8 and is now in Dr. Seamans' office. We are in the process of firming up the Engine Model Specification and Development Plan for this 2-year incentive-type contract.

L.B.

I understand the microswitch that operates the valve did not lock open

The failure of the Atlas on Tuesday of last week has been definitely tied down to the failure of a fuel butterfly pre-valve (upstream of the booster engines). The valve apparently opened as scheduled but did not lock open. When the ground pneumatic supply was disconnected at liftoff, fuel flow apparently closed the valve. (The valve was found in the debris with both the butterfly and the actuator in the closed position.) This same valve had performed successfully on all previous Atlas flights (about 27 successes prior to Tuesday's launch).

F-1 ENGINE

Of principal interest at the F-1 Program Review held at Rocketdyne March 2 and 3 was the fuel pump oscillation problem.

Rocketdyne has begun an analysis and test program to isolate the cause and eliminate the low frequency fuel pump inlet oscillations found during tests of F-1 engines at MSFC when operating at approximate vehicle NPSH conditions. Potential solutions will be evaluated with respect to effect on both oscillations and NPSH.

With regard to S-IC-T, results of a structural analysis at MSFC has indicated that S-IC-T can be operated with no detrimental effect.

Tw 3/8

B 3/11

NOTES 3-8-65 CLINE

NEGATIVE REPORT

NOTES 3/8/65 CONSTAN

1. GENERAL

Mr. M. Keith Wible is to serve on a temporary assignment to NASA Headquarters in connection with the average grade and salary survey throughout NASA, and at the conclusion of the survey, will fill a staff assignment at MSFC, Huntsville. Mr. Marion Hardee is appointed Acting Assistant Manager, in addition to serving as Chief of the Contracts Office here at Michoud.

2. S-I/IB PROGRAM

S-1-8 is at the Cape.

S-IB-1 ~~will be~~ was loaded on the barge Saturday, March 6, 1965, for shipment to Huntsville for static firing.

3. S-IC PROGRAM

The tunnel ducts are being installed in the "D" vehicle fuel tank, and it is anticipated to go to hydrostatic test on March 24. This is the first propellant tank to be completely assembled at Michoud, so Boeing hopefully has the "shakedown" bugs fairly well resolved and can expect to do better toward keeping the production schedule.

NOTES 3-8-65 DANNENBERG

B 3/11

1. Ground Abort for Unmanned Saturn IB Flights - To assure conformity of the five panel chairmen involved in the problem, the MSFC position was jointly formulated by R&DO and IO taking your own comments into account. This position is as follows:

a. S/C abort shall be effected by automatic on-board sequence following range safety cutoff and preceding destruct command. (This will also cover the case of early S-IB loss of thrust.)

b. As a general rule, there shall be no manual abort from ground during L/V powered flight.

c. There shall be no cutoff command from ground other than by Range Safety.

Five reasons for this position were listed.

Panel chairmen and project offices are informing their MSC counterparts on MSFC's opinion and, if changes are necessary, they will be negotiated by a joint MSC/MSFC group. Only in case of a true impasse will the Panel Review Board get involved.

2. Staff Stage Coordinator - The R&DO Staff Coordinator concept, previously applied to the S-II stage, has been extended within R&D Operations to include S-IC, S-IVB, and S-IB. IO stage managers have agreed to this approach.

R.D. on your staff. Or in Labs? B

3. Certificate of Flight Worthiness - The proposed procedure was reviewed at a joint R&DO-IO meeting. Agreement was reached on the content of the document. Minor modifications will be incorporated and the document issued as MSFC implementation of one ATR requirement. This item could become one of the major milestones for Incentive Contracting with MSFC major contractors. → ?

Very critical situation! B

4. S-IC Stage - As a result of the 3-4-65 review with Boeing on outstanding CAM's (Change Action Memos) concerning problems ME is having to meet the S-IC schedule, a meeting will be held on 3-9-65 with Boeing at Michoud to discuss methods to improve change flow time.

5. Deleted S-IC-1 CAM's - CAM 224 - Airborne TV Instrumentation System and CAM 225-S-IC Motion Picture Camera System have been deleted because the hardware cannot be furnished in time for incorporation into the stage without a major schedule slip. However, both CAM's will be incorporated in S-IC-2.

6. Discrete Propellant Utilization Probes - A meeting will be held the week of 3-8-65 on PU probes to discuss use of existing probes, possible change to another type and effectivity for deletion of probes.

7. S-IVB Welding Problems - Dr. Lucas, P&VE-M, and IO are setting up an Ad Hoc Group of technical consultants to work with DAC in resolving their welding problems.

Tw 3/8

NOTES 3/8/65 FORTUNE

B 3/11

No Notes This Week.

Lw 3/8

NOTES 3/8/65 GEISSLER

1. SA-201 and 202 Mission Objectives: The R&DO recommended Saturn IB, SA-201 and SA-202 launch vehicle mission objectives, agreed to in a joint R&DO/IO Feb. 23rd meeting are given in attachment 1. The question of ground command override on SA-201 and SA-202, through a flight controller as requested by MSC, was also discussed since it is an important input into the overall determination of launch vehicle/spacecraft mission objectives. It was generally agreed that from launch vehicle considerations the MSFC position is as follows: (a) S/C abort shall be effected only by automatic on-board sequence following range safety cutoff and preceding destruct command. (This will cover the case of early S-IB loss of thrust.) (b) There shall be no manual abort from ground during L/V powered flight. (c) There shall be no cutoff command from ground, except range safety. Dr. Kuettner agreed to coordinate an MSFC position to this effect with the MSFC Panel Co-Chairmen and to provide backup justification for the above MSFC position ~~(attachment 2)~~. The coordinated MSFC position will be officially forwarded to the MSC Apollo Program Manager by IO correspondence. R-AERO suggested that a distinction on 201 and 202 positions seems practical, i.e., pending success of vehicle 201, it appears feasible to have manual abort from ground, if proper safeguards are taken against inadvertent aborts.

2. Saturn V Direct Ascent Trajectories: At the February 25 Reference Trajectory Sub-Panel Meeting, the subjects of elliptical parking orbits and direct ascent for Apollo Lunar Mission were again brought up. (ref.: Notes 2/23/65 Geissler) MSFC representatives discussed the effects of using elliptical parking orbits and direct ascent. MSC representatives were receptive to elliptical parking orbit technique but not at all receptive to direct ascent, due to attendant reduction in launch opportunities. The selection of free return trajectories for the nominal Saturn V LOR profile is being questioned because: (a) Abandoning the free return trajectory constraint would permit payloads gains, if longer flight times (about 100 hours) were accepted; (b) LEM descent stage engine is now considered as a backup for the SM engine; (c) Impulse resulting from transposition and docking will produce deviations from free return trajectory anyway.

3. S-IVB LH_2 Tank Propellant Baffles: A system of propellant baffles was designed for the S-IVB LH_2 tank to suppress all sloshing at the end of S-IVB boost burn. The baffles will also reduce fluid motion in orbit. The system consisted of 3 ring baffles of 10 inch width spaced 12 inches apart. A predicted velocity distribution for the LH_2 slosh at orbit injection without baffles was provided. This maximum velocity was 1.5 ft/sec at the tank wall.

Please keep to 1 Page

Lw 3/8

NOTES 3-8-65 GRAU

1. S-IU-10 CHECKOUT: Malfunctions in the S-IU-10 Guidance Signal Processor power supply resulted in a two-day delay while the spare processor for SA-9 was shipped from KSC and installed. Indications are that this Laboratory will not receive the Pegasus Prototype Unit for Electro-Magnetic Compatibility testing. In this event, the S-IU-10 Instrument Unit will be rescheduled for release to Manufacturing Engineering Laboratory on March 23, 1965.

2. SATURN IB-IU CHECKOUT COMPUTER: The RCA 110A Computer for the Saturn IB-IU checkout complex has been installed. Checkout of the computer is expected to be complete and the computer operational by March 8, 1965. A potential critical delay accompanies the RCA 110A Computer due to the unavailability of spare parts.

3. S-IC CHECKOUT EQUIPMENT: The S-IC stage simulator has been successfully weighed and all weighing equipment checked out. Minor modification will be requested to perfect the equipment.

4. PEGASUS: The qualification test program at Fairchild Hiller Corporation is practically complete (with the exception of RFI tests). Testing not yet accomplished will be done sporadically. Monitoring of these tests is being delegated to the government agency with the reservation that all test data be reviewed by resident Quality and Reliability Assurance Laboratory representatives prior to acceptance by the agency.

5. ELECTRO-MAGNETIC COMPATIBILITY (EMC) TASKS: Reference paragraph 1 of NOTES 2-15-65 GRAU (copy attached). Our meeting with MSC in an effort to eliminate resistance to the EMC tasks was not fruitful. Further coordination, however, resulted in NASA Headquarters stating intentions to provide support. A meeting was held 3-4-65 with GE/Daytona personnel in preparation for a presentation to NASA Headquarters on 3-11-65 at which time a report will be made on the meeting with MSC and immediate support for the proposed EMC tasks will be requested.

6. DAC - SACTO EVALUATION: The implementation and effectiveness of the DAC - SACTO quality program was evaluated utilizing the appropriate criteria set forth in OMSF Standard SP-6003. No areas of significant nonconformance were revealed.

7. MOLAB PRELIMINARY MANAGEMENT PLAN RELIABILITY REVIEW: A review was performed on the Boeing Reliability and Safety portion of the MOLAB Preliminary Management Plan. Because of the generalities throughout the plan, NASA has no assurance that a contract based on this plan would result in a sound reliability effort. It was recommended that the document be rewritten and re-submitted.

ATTACHMENT: NOTES 2-15-65 GRAU (Copies to Dr. von Braun and Mr. Weidner only)

NOTES 3/8/65 HAEUSSERMANN

1. SATURN V ACTUATOR PROBLEM: An instability problem on the S-II actuator servovalve has been discovered during temperature cycling tests at Moog. The instability is an oscillation of the first stage flapper at approximately 500 cps. (A tendency of the flapper to oscillate under certain conditions had been noticed on the Saturn I design, but the frequency was around 1000 cps and no undesirable effects resulted.) Although this undesired 500 cps oscillation does not result in any motion of the actuator piston, it can have an adverse effect on the stiffness and response of the actuator, and on the life of the valve. A number of dimensional and configuration variations (nozzle size, flapper shape, etc.) are being tried by Moog in an attempt to introduce more damping to the flapper. Although certain combinations of changes have satisfactorily reduced the oscillation even under temperature variations, the problem is not yet considered to be completely resolved.

NOTES 3/8/65 HEIMBURG

1. F-1 ENGINE:

On 3/1/65, Test TWF-052 was conducted on the Static Test Tower West for a mainstage duration of 56.24 seconds utilizing F-1 Engine F-2007. This engine was removed and F-2003 was installed on 3/3/65. The first test on this engine is scheduled for 3/10/65.

2. S-IVB SACTO:

Out of four attempts to perform chilldown tests on 3/2/65, two were successful.

3. S-IC:

The S-IC-T was installed in the test stand on 3/1/65. The stage was aligned, preclamped and the lower horizontal stabilizing system installed. Preparations were completed by R-TEST and R-P&VE for the S-IC-T structural tests to begin on 3/8/65. The checkout of the facility lox system with LN_2 has been completed.

4. REMARKS ON 2/15/65 NOTES (COPY ATTACHED):

The "POGO" Group (P&VE) is aware of this problem and is investigating.

ATTACHMENT: NOTES 2/15/65 HEIMBURG (Dr. von Braun's and Mr. Weidner's copies only).

NOTES 3-8-65 HOELZER

1. ADP PURCHASE: We have asked Headquarters for additional funds with which to purchase our 7094 computer systems. This would bring the 1965 "buy" program to $6,952,000. More on this later.

2. LIEF SYSTEM: The interim LIEF system was used throughout the SA-9 launch with very satisfactory results. Local subsystems and communications support performed well and gave the Laboratory confirmation of the practicality and utility of the system being implemented. The major benefit from the LIEF/SA-9 exercise was in testing and developing procedures and operational requirements for the final system.

3. SA-9 REDUCTION:

The Computation Laboratory has received 103 analog tapes from Goddard Space Flight Center on March 4, 1965. A breakdown of the tapes are as follows:

a. 26 from Mojave, California
b. 6 from Johannesburg, South Africa
c. 4 from Lima, Peru
d. 8 from Santiago, Chile
e. 7 from Quito, Ecuador
f. 43 from Fort Myers, Florida
g. 9 from Womera, Australia

It is estimated that it will take approximately 80 hours of B-5500 time to fulfill R-RP-R requests on these 103 tapes.

Nine of the tapes from Fort Myers were reduced and the data appear to be of excellent quality.

4. ADP TASK GROUP FOR ADMINISTRATIVE AREAS:

Mr. Paul J. Eddy has been assigned to NASA Headquarters to work with a task group under the direction of Mr. John D. Young. The project outline of the task group is as follows:

Phase I - Study of present internal ADP operations
II - Analysis of internal ADP operations
III - Analysis of functional area uses of ADP
IV - Basic management concept of applying ADP
V - Recommendations
VI - Implementation

This assignment is for a period of approximately sixty days, beginning on March 15, 1965.

5. RESEARCH TASKS: It has been necessary to curtail the research effort in the Simulation Branch because of the loss of personnel and the new overtime restrictions. The research task to automate analog simulator checkout has been canceled and the funds allocated ($80,000) by OART will be released for other tasks.

Tw 3/8

NOTES 3-8-65 Koelle B 3/11

1. Agenda for Executive Board Meeting on Center Planning: As a result of your discussion concerning Center Planning, in the last Board Meeting, an Executive Board Meeting is planned for the afternoon of March 26 to deal with this problem. The Working Group you appointed in September of last year had 10 full working sessions and is now in the process of compiling an interim report. We can offer the following agenda for the above meeting:

a. Relevant Center Statistics and Trends of Interest for Long Range Planning	F. Evans (E)	20 min.
b. Objectives of the National Space Program	W. Huber (R-FP)	10 min.
c. Limitations of National Resources for Space Flight	C. Rutland (R-FP)	10 min.
d. Preferred Philosophies of MSFC Key Personnel	F. Williams (DIR)	10 min.
e. Tentative List of Candidate Future Projects		
(1) Projects within the structure of the Apollo and AES program (through 1971)	Dr. Kuettner (R-SA)	10 min.
(2) Projects related with Saturn launch vehicles after 1971	C. Barker (R-P&VE)	10 min.
(3) Projects not related with Saturn launch vehicles after 1971	R. Voss (R-FP)	10 min.
f. Center Selection Criteria Proposed	Dr. Koelle (R-FP)	10 min.
g. Selected Approach for the Analysis	Dr. Koelle (R-FP)	30 min.
(1) Definition of the problem		
(2) Methodology		
(3) Expected results		
h. Milestones and Planning Schedule	Dr. Koelle (R-FP)	10 min.
i. Discussion	Dr. von Braun (DIR)	50 min.

The presentations proposed above do not completely cover the available material, but should suffice to lead to a productive discussion. I hope that we will have an open-minded audience.

HHK O.K. B 3/11

WK

Bob Young's decision to slow down Qual Testing to alleviate funding jam ? B

fw 3/8

NOTES 3-8-65 KUERS

1. Report on S-IC-501: Reference: Your invitation for further comments on my NOTES 2-15-65, copy attached. It is true the picture for S-IC-501 is not very rosy. The situation we are now confronting is the result of decisions made 6 or 12 months ago. I can assure you that every effort to minimize schedule delay is being made jointly with IO and Boeing in expediting documentation and delivery of hardware for the tremendous number of CAM's and changes. A review of all new changes for 501 which are presently in the definition and engineering phases and which will make the situation considerably worse was conducted by IO jointly with Boeing and R&DO Laboratories. The systems engineering for S-IC has just not sufficiently advanced to support the Plan VII assembly schedule. The bleak picture is only meant as early advanced information on potential--though very likely--delays which will become apparent in 4 to 6 months from now. We will not change our target dates at the present time.

1.0.

Sounds grim B

2. Lox Tunnel Sizing: The Lox Tunnels for 501--and also 502 which are presently in Michoud--have been delivered by The Parsons Company in an oversize condition, as reported 2 weeks ago. Since then, it was found that the bonding of stiffener rings was inadequate; therefore, the tunnels have to be returned to the vendor for rebonding. For 501 welded tunnels--not in one piece--as they were used for the -T stage--will be put into the Fuel Container. Our efforts, however, to reduce or swage these aluminum Tunnels by magnetic devices have been successful on a spare Tunnel. A reduction of approximately .100" diameter was accomplished.

3. Qualification Testing for Lox Pressure Volume Compensators (PVC's): Arrowhead has experienced another PFCT failure on the Inboard Lox PVC. The failure occurred during life cycle testing. Arrowhead has indicated no impact on delivery schedule for 501 or test completion date. We are investigating further.

4. Cost Increase for Part IX of Boeing Contract: Boeing has submitted an increase of 455,000 manhours for new work, added from January 1 to January 28, 1965, required in support of in-house S-IC program. This estimate appears to be very high. It is probably caused by changes and is an indication of the magnitude of additional work created by CAM's.

7w3/8

NOTES 3/8/65 MAUS B 3/11

1. APOLLO-X/GEMINI-B MOL STUDY - B. A. Abbott attended a Cost and Schedule Group Meeting at MSF on March 4, at which time the status, groundrules, time schedule, and planned actions for the study were discussed. Results are being summarized, and will be furnished to you as soon as completed. ✓

2. APOLLO COST STUDY - This study is a separate exercise from Apollo-X/Gemini-B MOL Study, mentioned in item 1 above. The Cost Study is proceeding as described in my NOTES 2/23/65. MSF and MSFC are supplying team members, information and direct access to prime contractors. Through our participants, we will insure that the team is aware of cost items, not currently under contract, which MSFC's program managers consider necessary.

   Since the National Launch Vehicle Study was completed less than one year ago, the Saturn IB data available from that study will be used to the maximum extent acceptable to the Cost Study Director, (G.E. Barber of D. Wyatt's office). ✓

3. BOEING INDIRECT AND DIRECT MANPOWER AND COST REVIEW - It appears that the plan being developed for this review can be used as a standard approach for semi-annual in-depth major contractor reviews. There are three major unresolved areas (1) the type of sampling to use in the review of tasks, i.e., 100%, selected, random or a combination of the latter two. The 100% technique used at S&ID appears too burdensome to be practical. (2) The composition of the review team - this becomes a part of the bigger subject, i.e., R&DO support to I.O. Both Col. O'Connor and Mr. Weidner have been made aware of the requirement so that it can be included in their support agreements. (3) The availability of qualified people - this type of activity, to be meaningful, requires personnel very skilled with broad experience in the many phases of the contractor's operations. The number of such people is limited and most have more than a full-time job now. ✓

Fw 3/8

NOTES 3/8/65 McCARTNEY B 3/11

1. PRINCE PROGRAM: Resources Management has participated in discussions with ASTR and QUAL labs concerning Gen. Phillips' instructions to expand the PRINCE Program to include all NASA Centers. ASTR is planning a general meeting on the subject to acquaint NASA Headquarters working level people with status and techniques of operations. This meeting is being planned to coincide with the transfer of responsibility for the program from ASTR to QUAL. The decision to transfer this responsibility to QUAL is based on the fact that the PRINCE Program is more closely aligned with reliability and quality control. ✓

2. FY-65-2 PEP: R-RM has prepared and distributed R&D Operations guidelines for the next PEP Submission by the laboratories. These guidelines were in implementation of Center guidelines and represented a close coordinated effort between R-RM and R-SA to integrate technical requirements with the budget submission. This effort is a result of the Staff Coordinator concept which was reported to you in the 12/7/64 NOTES (See attached, paragraph 1). ✓

3. POSITION REVIEW AND EVALUATION PLAN: Benchmark Manuals in support of the Position Review and Evaluation Plan were distributed to R&D Operations supervisors on March 4, 1965. Training of first-line supervisors in preparing position descriptions will begin today and will be later followed by the training of intermediate-level supervisors in evaluating and allocating positions. It is now planned to survey position types, rather than organizational groups as was originally planned. It is expected that all positions be reviewed prior to July 1, 1965. ✓

O.K. Bill Lee BW 3/11

Bonnie

Please get me such a Benchmark Manual. I've never seen one

B

Tw 3/8

NOTES 3/8/65 RUDOLPH

B 3/11

1. S-IC-501 - Reference your note to Col O'Connor concerning change action memo (CAM) status as reported in Notes 2/23/65 Constan (copy attached). Col O'Connor requested that I report corrective action to you. Attached is a one-page summary for your information.

2. Implementation of New MSF Schedule (MA-2) - Saturn V Program Directive No. 7, implementing the new Saturn V Delivery and Launch Schedule (MA-2), has been issued. This schedule will be referred to as MA-2 on all external correspondence and as schedule "K" for internal MSFC reference.

3. S-II Battleship Stage Status - Delivery of GSE for Battleship Cluster Firing has been completed and engine positions #2 and #5 are currently being prepared for engine installation.

4. S-II Structural Test Stage (S-II-S/D) Status - Instrumentation of the structural test stage (S-II-S/D) and the test tower is progressing satisfactorily and current indications are that structural testing of this stage may start prior to the April 16, 1965, schedule date.

5. S-II Stage Common Bulkhead Test Facility Status - Construction of the Common Bulkhead Test Facility at Santa Susana has been completed and activation has begun.

6. S-II Stage Seven Engine Study - Headquarters has requested that the S&ID study to increase the S-II Stage performance by converting to a six or seven engine stage be forwarded to Mr. Edward Z. Gray, Director of the Advanced Manned Missions Program Office, and Mr. T. H. Thompson, Director of the Systems Engineering Office (Bellcomm). We are complying with this request.

7. S-IVB-501 Status - Structural fabrication is proceeding generally on schedule. Manufacture of the LH_2 cylinder is complete. The LOX tank has been installed in the tooling tower in preparation for joining to the LH_2 cylinder.

DAC Engineering Releases are behind schedule. MSFC and DAC are currently working together to develop a schedule recovery plan.

8. Status of G.E. Contract Negotiations - The negotiations and staffing of the Design and also the Fabrication Missions with G.E. for ESE are presently on schedule except the G.E. cost proposal on the Fabrication Mission was delivered two days late. We plan to absorb this two-day delay within our review time. An in-house MSFC meeting was held on Wed, 3 Mar 65, during which the comments to the G.E. Fabrication and Checkout proposal were reviewed for incorporation into the statement of work that will be negotiated with the contractor this month.

2 Attachments: 1. Notes 2/23/65 Constan 2. Summary on CAM Status
(DIR, I-DIR, and R-DIR's copy only)

Tw 3/8

B 3/12

NOTES-3-8-65-SHEPHERD

Shep
If that's the only way to keep the SII test stand at MTF on schedule, I'll be very glad to talk to GE again.
B
Please advise

S-IC-4: During the conversation with Bill Lilly on March 4, he emphasized that Dr. Mueller was not at all inclined to approve any testing beyond S-IC-3 at Huntsville. As you recall, one of the earlier plans was to begin testing at MTF with S-IC-3 (S-IC-1 and 2 planned for Huntsville). However, due to the S-IC test stand construction slipping and priority assigned S-II testing at MTF, the decision was made to bring S-IC-3 to Huntsville for acceptance. Apparently Dr. Mueller views this as a trend.

Congressional Hearings: The following observations were made during the March 4 continuation of Dr. Mueller's general briefing to the Teague Subcommittee: (1) Committee attendance was very poor (Teague and Schisler - full time; Fulton, Daddarido, Rodenbush and Casey - part time). (2) Mr. Fulton ask the majority of questions, Daddarido participated very little. The meeting adjourned at 11:15. The following day the subcommittee was to hold hearings in Houston. Col. Gould, Technical Consultant to the Committee, told me that the Houston hearings were to be two hours in length, followed by a stock show and banquet. He half seriously suggested this may be the way we should hold our hearings in Huntsville in the future, that is little attention to the program and maximum unrelated activities. After the Teague Committee adjourned I attended the hearings that Congressman Karth's subcommittee on Science and Astronautics were holding. The material presented by Dr. Mueller was of considerable better quality. The Karth Subcommittee appeared more interested in the technical and scientific aspects of the program than does the Teague Subcommittee. Karth's subcommittee has four new members, three of which visited here - Roy Taylor, William Anderson and Barber Conable. The fourth member is Weston Vivian (the only PHD in Engineering in Congress).

Boeing Space: The Boeing Company submitted their proposal for the construction for their office building on March 1. The method proposed by Boeing for amortization was not acceptable. Col. Hirsch proposed to Boeing that they consider one of two methods; a 15 year straight line or a 25 year sum of digit amortization. Indications from Mr. H. W. Neffner of Boeing are that they will accept one of the two methods. The Boeing Board of Directors are meeting today in Seattle at which time this matter will be discussed. It is expected that Boeing will decide to amortize using the straight line method.

fw 3/8

NOTES 3-8-65 Stuhlinger B 3/12

1. PEGASUS A: Real-time data continued to be recorded by Satcon and Green Mountain. Results are being published every Monday in the "Pegasus Bulletin". The first set of 103 tapes from Standan Stations arrived March 4 from GSFC. After they are processed through the Pegasus data processing system in Computation Laboratory, they will permit us to verify and further analyze meteoroid hit data. ✓

Smithsonian Astronomical Observatory (Dr. Lundquist) took Baker-Nunn photographs of Pegasus which verified the 9.5° Sec^{-1} roll rate, in addition to the precession, that had been determined earlier from onboard solar sensor data. The motion of the satellite has now developed into a flat spin around the axis of major moment of inertia (perpendicular to plane of wings). ✓

2. CIS-LUNAR PEGASUS: Experience gathered with the evaluation of Pegasus A data leads us to believe that even the "minimum" version of a cis-lunar Pegasus must possess the capability of measuring temperatures, radiation levels, and certain details of each hit pulse, in order to permit meaningful analysis of hit records. A list of suggested minimum measurements will be sent to Sat I/IB Office this week, with the suggestion that the guidelines for the "minimum" version be changed before too much effort has been spent on a study which would not lead to a meaningful project. ✓

3. OPTICAL TECHNOLOGY SATELLITE (OTS): Two members of OART (Dr. T. Walker and Mr. R. Chase) discussed details of the OTS with Drs. Lange, Kuettner, Randall, Mechtly and Stuhlinger last week. The satellite would be carried up by a Sat IB. Preliminary project studies were made by contractors, and as an inhouse effort by RPL together with Astrionics and P&VE. It is hoped that MSFC can arrive at decisions regarding participation in several potential satellite and space probe projects in the near future. ✓

4. LUNAR EXPLORATION PROGRAM: This Laboratory was asked by Ed Gray, MSF, to expand its present activities in the Apollo Extension Systems (AES) very considerably by taking over the present function of a contractor (NAA) to organize and pull together the very broad work of 12 scientific panels on lunar exploration. The scope of this effort encompasses AES, LESA, and post-LESA exploration. We expect to discuss this request with R&DO management along with discussions about AES project. ✓

March 15, 1965

CONFIDENTIAL

GEORGE C. MARSHALL SPACE FLIGHT CENTER
HUNTSVILLE, ALABAMA

DXD

Memorandum

TO Recipients of Weekly Notes to Dr. von Braun

DATE April 14, 1965
R-AERO-DIR-65-21

FROM Special Assistant to the Director
R-AERO-DIR

SUBJECT Security Classification of "Notes 3/15/65 Geissler" and "Notes 4/12/65 Geissler"

Notes 3/15/65 Geissler, items 1 and 2 should have been classified confidential because of their reference to payload weight capabilities expressed as exact values. Item 4 of Notes 4/12/65 Geissler, should also have been classified confidential. Accordingly, it is requested that the recipients of subject notes reclassify their copies to confidential.

Paul A. Larsen.

Paul A. Larsen

Copies to:

Dr. von Braun, DIR
Mr. Williams, DIR
Dr. Rees, DEP-T
Mr. Newby, DEP-T
Col. O'Conner, I-DIR
Dr. Rudolph, I-V
Col. James, I-I/IB
Mr. Fortune, I-MTO
Dr. Constan, I-MICH
Mr. Belew, I-E
Mr. Maus, E-DIR
Mr. Shepherd, AST-F
Dr. Lange, AST-S
Mr. Weidner, R-DIR
Mr. Cline, R-P&VE-DIR
Mr. Grau, R-QUAL-DIR
Dr. Haeussermann, R-ASTR-DIR
Mr. Gorman, DEP-T
Mr. Heimburg, R-TEST-DIR
Dr. Hoelzer, R-COMP-DIR
Dr. Koelle, R-FP-DIR
Mr. Kuers, R-ME-DIR
Dr. Stuhlinger, R-RP-DIR
Mr. Jean, R-AERO-DIR
Mr. de Fries, R-AERO-S
Mr. McNair, R-AERO-P
Mr. Horn, R-AERO-D
Dr. Speer, R-AERO-F
Mr. Dahm, R-AERO-A
Mr. Baker, R-AERO-G
Mr. Vaughan, R-AERO-Y
Mr. Butler, R-AERO-R
Mr. Dannenberg, R-SA
Mr. McCartney, R-RM

CONFIDENTIAL

GROUP 4
Downgraded at 3 year intervals;
declassified after 12 years

MSFC - Form 488 (August 1960)

NOTES 3-15-65 BELEW

B 3/25

RL10 ENGINE

The two-year RL10 follow-on R&D program has been approved by Dr. Seamans and Mr. Webb. We expect to submit an RFQ to P&WA within the next month.

I will be present at the RL10 program review at P&WA this week. Duff Ginter, OSSA Centaur Program Manager, and Charlie King of MSF also plan to attend.

Testing of a proposed increased diameter fuel boost pump recirculation line for Centaur is scheduled to begin on the RL10 dual position test stand this week. The increased diameter line is designed to reduce the probability of fuel tank ullage collapse encountered on AC-4.

H-1 ENGINE

Formal qualification of the 200K engine is progressing with Engine S/N 7055 (Outboard). Four of ten full duration calibration and gimbal tests have been satisfactorily completed. The next test series of this engine will be environmental and safety limits. The second engine (S/N 4055 - inboard) is scheduled to begin calibration testing on March 18, 1965.

F-1 ENGINE

Retrofit items for S-IC-T Stage (Interface Panels, Heat Exchangers, GG Injectors), mentioned in the February 26 report, are enroute from Canoga Park via truck which will arrive at MSFC on Monday, March 15, 1965. Delivery on that date enables T-Stage engines to be retrofitted to meet the current cluster firing plan.

J-2 ENGINE

The engine for SA-202, J2016, has completed hot-firing acceptance testing and is currently undergoing post test checkout.

A successful ten-second mainstage firing with J-2 engine J2013 was conducted Saturday, March 13, on the S-IVB Battleship stand at Sacramento, Calif. A full duration test is planned for this week.

Production engine J2018 is ready for installation on test stand Delta 2B today.

R&D engine J014-2, an FRT configuration engine, is continuing the pre-FRT test series. Four successful 500-second duration firings were conducted last week. Primary objectives were start sequence evaluation, gimbaling, and 70/30 propellant utilization mission simulation.

Engine Program Office representatives attended the S-IVB Program Review at Douglas Aircraft Company, Inc., last week. A new engine delivery and kit modification schedule for the first three flight engines was agreed upon.

GEMINI ENGINE FOR S-IVB STAGE

Hot-firing on first MSFC Qual engine is scheduled for March 17, 1965.

Initial delivery of two engines was made last week to Douglas Aircraft Company for prototype APS module ground tests.

NOTES 3-15-65 CLINE

B 3/25

1. FIRE OCCURS DURING S-IVB BATTLESHIP CHILLDOWN TEST: (Reference NOTES 2-15-65 CLINE, paragraph 3) Information requested is being forwarded under separate cover. ✓

OK I *

2. 200K H-1 ENGINE LIMITS TESTING CONTINUES: An S-IB-206 configuration engine has undergone 15 tests for a total of 1700 seconds at a thrust level of 210K to 224K. No component damage has been reported. ✓

OK II *

3. S-IVB ORBITAL OPERATIONS PROBLEMS IDENTIFIED: Following identification of phenomena which could cause venting and restart problems, Douglas Aircraft Company was directed to install LH_2 tank slosh baffles, LOX and LH_2 suction and recirculation return line diffusers, and an LH_2 vent liquid/vapor separator in SA-203, 501 and subs; and to study need for additional LOX tank slosh baffles, attitude control-orbital propellant dynamics coupling, and backup for the S-IVB/V orbital vent system. ✓

Attachment #1: NOTES 2-15-65 CLINE

NOTES 3-15-65 DANNENBERG B 3/25

1. In-Flight Experiments - A meeting of the Experiment Review Board was held 3-11-65. Mr. Denicke, Executive Secretary of the Manned Space Flight Experiments Board outlined the rather involved MSFEB procedures and efforts being made to improve operations. There are indications that this activity may move to the Seamans level. He suggested interchange of information at the working level between MSFC, MSC, OSSA, OART, Apollo Program Office, and his office. The regular MSFEB meeting will be replaced this month by an Experiments working group meeting on 3-22-65.

K.D. Request details B

The Chrysler Corporation made a very interesting briefing on orbital telescopes for AES. Most concepts involve an off axis focal plane, which would make focusing and photographic adjustments possible in a "shirt sleeve" environment through the use of a gate seal, the major elements not being exposed to the cabin environment and windows.

↓ ditto

2. Voyager - During a GE presentation on the use of Voyager with Saturn V, a good proposal was presented for an unmanned roving vehicle for Mars exploration that could be a logical follow-on of the basic technology MSFC is developing for MOLAB.

3. S-IC-F - In a presentation on 3-5-65, Boeing stated that they could not meet the present S-IC-F schedule unless the configuration was altered to meet only the essential requirements as outlined by KSC. MSFC is presently reviewing the Boeing recommended configuration to insure that all the essential systems are being retained.

4. Re Notes 2-8-65 Dannenberg, (attachment 1) - TNT equivalents ranging from 6 to 60%.

5. Re Notes 2-23-65 Dannenberg, (attachment 2) - General Phillips pointed out in the last PRB meeting that he had intended to make a special presentation on this subject, but run out of time. The Joint Operations Group meeting, under chairmenship of General Phillips and Mr. Christiansen, is taking place 3-17-65 at the Cape. He may or may not elaborate there on more details. We will keep you posted.

NOTES 3/15/65 FORTUNE B 3/25

1. Labor Situation at MTO - has been peaceful sinse November 1st. However, this week approximately 150 E. C. Ernst Company's electricians cost us 300 man-days of work in a dispute over management rights to select its own project manager, superintendent, and foreman. The Company accused the Union of sending unqualified, lazy men to the job site, at Leavell-Kiewit's test stand work and Broadway-Glantz propellant facilities. A few of Leavell-Kiewit's operating engineers and cement finishers also lost a few days, each in dispute with Leavell-Kiewit management. ✓

2. MTO Staffing - We continue to experience serious difficulties in our efforts to establish a satisfactory permanent staffing structure for MTO. Several restrictions imposed by Personnel Office on MTO grade levels have placed adverse effects upon our ability to develop an organization which can execute the responsibilities delegated to the Manager of MTO. We look to the utilization of the Tabaka PREP Manual for relief with respect to this situation. This relief is mandatory if we are to get qualified personnel from R&DO on an in-grade transfer basis. MTO has vacancies at the present time which we are unable to fill because of the constraints mentioned above. This is of major concern and represents one of our most serious problems. We cannot hope to staff MTO with people who have the necessary experience while restricting ourselves to an unrealistic grade structure. The activation effort will require more people on a loan basis for various periods of time in addition to those required for MTO on a permanent basis. ✓

Harry S. FYI B

3. A Major Aspect of the ATF Organizational Concept - is the development of Complex Operational Groups (COG's). For better interface control, COG Chiefs are being assigned by each ATF Associate and COG Organizations are being developed. ✓

4. This week, ATF Briefings were given - to Dieter Grau and "Project 60" people from Atlanta, Karl Heimburg, Col. Yarchin and Matt Urlaub. Briefings on ATF concepts were also presented to Messrs. Arnett and Glavin from Procurement Division of NASA Headquarters. ✓

5. An Agreement has been reached with the Corps of Engineers - to permit the ATF and the Work Group to participate in C of F test conferences held between the Corps and its contractors and also to participate in test demonstrations of facilities/systems prior to acceptance by the Corps of Engineers. ✓

NOTES 3/15/65 GEISSLER B 3/25

1. Saturn V Performance: The lunar injection payload capabilities for the various vehicles as of March 1965 are: SA-501: 86,233#; SA-502: 86,385#; SA-503: 86,779#; SA-504: 97,312#; SA-505: 97,562#; SA-506 & Subs: 99,874#. ✓

2. Saturn IB Performance: The performance capability for each Saturn IB vehicle for its respective mission as of March 1965 is as follows: SA-201: 27,890 fps reentry velocity; SA-202: 29,110 fps reentry velocity (based upon preliminary MSC targeting conditions of reentry longitude of 135° and a flight path angle of - 3.5°); SA-203: 20,560 lbs of liquid hydrogen (does not include residual or trapped hydrogen in S-IVB); SA-204: 34,600 lbs payload; SA-205: 36,510 lbs payload; SA-206 & Subs: 36,710 lbs payload (SA-206 does not reflect the possible "LEM Alone" mission).

3. Saturn IB/Centaur/Cislunar Pegasus: A typical flight profile of the Saturn IB/Centaur vehicle for the Cislunar Pegasus mission has been determined. The flight profile consists of the S-IB stage, S-IVB stage, and suborbital start of the Centaur stage to place the payload into a 555 KM circular parking orbit. After a coast, the Centaur is restarted to inject the Pegasus into a 550 KM perigee by a 180,000 KM apogee ellipse. The period of the ellipse is 1/8 of the lunar period. The shaping has been used to stay reasonably close to the profile for Saturn IB/Voyager, and represents a tentative selection. The Saturn IB/Centaur payload capability for the mission is 11,630 lbs assuming a Centaur stage with 200 lbs of permanent insulation and a total jettison weight of 4945 lbs. The Pegasus payload is expected to be close to 4000 lbs and therefore a secondary payload or ballast of 7600 lbs would be required. At this time it is not clear that the present volume is sufficient to include this ballast or payload. By raising the perigee one could eliminate this problem and at the same time increase the lifetime - most likely longer periods and increased apogee would also result from such a choice. ✓

4. SA-8: It has been decided to interchange the LOX and LH_2 non propulsive vents. This will alleviate the expected roll since blowdown occurs prior to wing deployment. New trajectory shaping should remain basically unchanged except that equal confidence be achieved for guidance cutoff and for the roll rate not to exceed the design value of 6°/s (applying the new mechanism found in SA-9 in addition to the alignment tolerances considered previously). Investigations are continuing. ✓

5. Flight Control Operations Panel: The 12th panel meeting was held on 3/9 at GSFC. Dr. Speer presented the MSFC position on ground command. The MSC program office will answer. Later in the same meeting it was announced that Gen. Phillips requests full briefing on this subject next week at the Joint Operations Group meeting. Also discussed in the panel meeting was flight control of 203. MCC-Houston will probably not be available. A plan is being prepared to use the Huntsville Center for this mission. ✓

NOTES 3-15-65 GRAU B 3/25

1. S-IU-10 CHECKOUT: The original checkout schedule for S-IU-10 has been revised to delete Electromagnetic Compatibility Tests on the Pegasus Prototype Unit. Checkout completion date is now March 25 and checkout is on schedule.

2. R-QUAL S-IC GSE: The End Item Test Plan for R-QUAL S-IC GSE has been reviewed by the Laboratory and approved pending incorporation of certain changes. There appeared to be no major problems. Boeing has sub-contracted portions of the GSE fabrication effort to Hayes and other companies with the hope of getting the station back on schedule. A representative of this Laboratory accompanied Boeing personnel on a trip to Hayes recently to evaluate the status of work. It was encouraging to find Hayes was delivering most of the hardware on or before scheduled dates.

3. S-IVB RELIABILITY PROGRAM: A thorough review of the revised S-IVB FY-65 reliability program has been made by personnel of this Laboratory and DAC. Of the 15 tasks which had been deferred by agreement between DAC and the S-IVB Stage Office, five were determined to be most critical. It has been recommended to the S-IVB Stage Office that DAC be given the go-ahead to implement these five tasks as soon as possible.

4. CRACKED SLEEVES: As a result of the discovery of cracked sleeves on S-I-9, an investigation was initiated to determine if the same problem existed on S-I-8 or S-I-10. On S-I-8 all sleeves between the Thrust OK Pressure Switches and Benton Hand Valves were changed when the "CALIPS" switches were installed at Michoud. The correct sleeves have been installed on S-I-10. "CALIPS" switches are not available and will not be used on this vehicle according to present plans. Reference your comment on cracked sleeves in my NOTES of 2-23-65 (copy attached). As stated, an error was made through a series of circumstances which deviated from Standard Operating Procedures. Procedures have been formulated which provide for the handling and documentation of unusual or abnormal occurrences; however, there have been and continues to be so many "special arrangements" or "agreements" made regarding documentation or work arounds to meet schedules that having a procedure is not, within itself, a final guarantee. We are quite concerned with the status of documentation and the "special arrangements" on the S-IC program. The criticality of the program and necessity of the present course of action is recognized, but the quality program is, to an extent, vulnerable under these circumstances. Every effort possible is being expended to prevent overlooking anything.

ATTACHMENT: NOTES 2-23-65 GRAU (Copies to Dr. von Braun and Mr. Weidner)

NOTES 3/15/65 HEIMBURG

1. S-IC: The S-IC-T thrust structure load tests were performed March 8-10, 1965. Preparations were made for removing the lower spider from the test stand on 3/15. A checkout of the lox transfer system was made on 3/13, with liquid oxygen, utilizing the 1,000 g.p.m. Byron Jackson pump received from Cape Kennedy. R-ME is proceeding with installation of the workaround and control systems.

2. S-IVB SACTO: Chilldown tests were completed.

3. F-1 ENGINE: Test TWF-053 was conducted on engine F-2003 at the Static Test Tower West on 3/10, with a mainstage duration of 56 seconds. All objectives were achieved. Engine F-2009 was installed on 3/11, with the initial test scheduled for 3/18.

4. F-1 TURBOPUMP: Test C-006-16 was conducted on 3/9, for a scheduled duration of 80 seconds. The purpose of this test was to investigate the effects of helium injection on pressure oscillations throughout the fuel feed system. Helium was injected into the fuel suction line intermittently at flowrates of 1%, 1.5%, and 2% of the volumetric flowrate. Preliminary information indicates that during each flowrate tested both frequency and amplitude were reduced, the latter considerably at the higher gas flowrates. The difference in dampening of pressure oscillations between 1% and 1.5% gas injection was significant. No appreciable difference could be observed between 1.5% and 2.0%.

Another test will be conducted to complete the study of helium injection. During this test, helium will be injected at different flowrates with the turbopump operating at vehicle inlet conditions.

ATTACHMENT: Utilization of Building Number 4551 (attached to DIR and R-DIR only)

NOTES 3-15-65 HOELZER B 3/25

1. COST SAVINGS THROUGH AUTOMATION: A saving of approximately 25 hours per week overtime in Data Reduction Branch has been effected by having two analog tape machines in Building 4663 turned on by remote control from the Green Mountain Station during Pegasus passes at night. Upon receipt of a pass, the Green Mountain operator deviates a sub-carrier oscillator from 21 KC to 24KC; this frequency shift applied to one channel of the microwave system is used to start the two tape recorders in the Computation Laboratory. Pegasus MM-1 link is recorded-predetected, and MM-2 link is recorded direct, using two more channels of the microwave system. Tapes are then rewound and processed early the next morning during regular duty hours so that Research Projects Laboratory may have fairly recent status of the Pegasus. ✓

2. AUTOMATIC CHECKOUT SUPPORT PROGRAMS: Data Processing computer programs developed in support of automatic checkout by Computation Laboratory for Quality Laboratory have been forwarded to the Slidell Computer Facility for use by the Boeing Company as part of their automatic checkout procedures. This action will permit concerned segments to communicate in the same language and format at a savings to the government in manpower and time. ✓

3. INTEGRATED PROCUREMENT SYSTEM: The Task Group established by Mr. Newby in November, 1964, to recommend interim improvements and design an integrated, mechanized procurement system presented progress to date on March 11, 1965. Present were Mr. Newby, and representatives of Financial Management Office, Purchasing Office, Technical Services Office, Management Services Office, Executive Staff, and Computation Laboratory. Some basic management problems as to scope and method of approach were raised, and will be resolved by Mr. Newby and chiefs of the participating organizations. ✓

NOTES 3/15/65 JAMES B 3/25

PEGASUS "B": Pegasus "B" is progressing on schedule. The canister successfully completed thermal vacuum tests over the weekend. Modifications agreed to at Bladensburg on 3/12 will be incorporated as hardware becomes available. ✓

S-IB-I: S-IB-I arrived at MSFC over the weekend (not KSC as reported in my 3/8/65 Notes) and will be installed in the test stand today for static test operations. ✓

IU MISSION CONTRACT: The Saturn IB/V IU Mission Contract package was submitted to Headquarters on 3/11 for approval. Personnel from the Program Office and Contracts Office will visit Headquarters to attempt to expedite contract approval. ✓

STATUS OF OBLIGATIONS AND COST AS OF FEBRUARY 28:

	Saturn I		Saturn IB	
	Obligations	Cost	Obligations	Cost
Planned through February	28.5	51.1	142.0	129.8
Actual through February 28	25.0	51.5	134.9	131.5

CISLUNAR PEGASUS: It is estimated the PDP for Cislunar Pegasus will be completed about April 5 based on all technical inputs being available by 3/29. A briefing will be scheduled the week of April 5-9 to present technical results of "minimum modification study" to Drs. Mueller and Bisplinghoff in Washington. A dry run will be held at MSFC with Headquarters participation on April 1 or 2. OMSF has not yet notified OART that MSFC is preparing a PDP, but will do so this week. ✓

S-IVB GROUND COMMAND CUTOFF: (MRAZEK) The MSFC position on the Ground Command Cutoff for SA-201 and SA-202 was presented at Flight Control Operation Panel meeting at Goddard March 9-10. MSC acknowledge MSFC's position, but did not indicate they would accept the compromise offered. Word was received from Headquarters during the meeting that General Phillips wanted this subject discussed at the Joint Operations Group meeting this week at KSC. The MSFC position was forwarded to MSC, Apollo Program Office, from this office on 3/12.

S-IVB FLIGHT STAGE FOR SA-201: The stage system checkout is in process at DAC, Huntington Beach. Installation of electrical and plumbing shortages continue. Continuity checks are complete as far as shortages permit. DAC still plans to ship the stage to SACTO on 4/26. This will necessitate several checkout tests at SACTO instead of Huntington Beach. ✓

S-IVB BATTLESHIP: Successful 10 second firing conducted 3/13 and a full duration firing is scheduled for 3/17. Final decision on extending the test program from May 14 to June 25 has not yet been made. ✓

has meanwhile decided in our favor. (Exec. Meeting, 22 March, at Cape. Phillips made the decision. Gilruth agreed reluctantly). B

NOTES 3-15-65 Koelle B 3/25

1. NEW NAME FOR REUSABLE ORBITAL TRANSPORT: Mr. Gray picked a new name for the ROT which is descriptive all right, but not very practical for day-to-day use, namely:

Sure better than ROT, which always gave me a rotten feeling B

"Reusable Multi-Mission Aerospace Transport (RMMAT)"

2. WORTH MODEL FOR NATIONAL SPACE PROGRAM: We have made the following major changes in our "worth model" (return on investment with common denominator):

a. We have included the results of the space program, since the very beginning of 1955 (it was designed to account only for the Post-Apollo program previously).

b. We have eliminated the cost-effectiveness parameters as indications of program yield, thus greatly simplifying the calculation, without an apparent loss of accuracy in results. The "program cost" will be combined with "program worth," and thus result in "program effectiveness" (cost/worth).

c. This model has incorporated the results of the last industry-wide opinion poll on the space program objectives.

d. The new model will permit us to compare the accomplishments of the U. S. space program with those of the USSR, on a real time basis. We are in the process of determining this, as of December 31, 1964. This should be quite interesting, as there has been no evaluation method up to now, to add up all accomplishments by one country, using a common parameter which measures the overall program success. ✓

3. CENTER PLANNING: We are charging full speed ahead to prepare our presentation to the Executive Board on March 26, 1965 (afternoon). ✓

Up to now we have asked the members of the Executive Board to make two judgments:

a. On preferred Center evolution philosophies,

b. On Center selection criteria for future projects.

We hope that the board members will be responsive to our request, otherwise we just can not crank in their judgments early enough in the overall analysis, as you insist we do! ✓

NOTES 3-15-65 KUERS B 3/25

1. S-IC Status: The upper unit for the structural load test vehicle S-IC-S--consisting of Intertank Section, Lox Container, and Skirt Section--was delivered last Wednesday, 2-1/2 weeks ahead of schedule. The lower unit--Thrust Structure plus Fuel Container--was delivered the beginning of February. The delivery last week completes the manufacturing phase of the structural load test vehicle. This early completion enables us to advance also the Lox Container fabrication for 501. We have already started, in fact, the vertical assembly of this container in the tower. The confidence level to accomplish the systems installation for 501 within the given time frame has not substantially been raised. I will report to you next week in my Notes on all the special steps which have been initiated jointly with IO and Messrs. Nelson, Dunnigan, and Coenen from The Boeing Company to minimize the schedule impact caused by the delinquent and under-supported systems engineering. ✓

2. Structural Technology Development: A structural technology development plan in support of Saturn V was presented to E. Z. Gray last Wednesday outlining the FY-66 funding requests for experimental projects. The projects are an outgrowth of the past two years' efforts in Titanium, Beryllium and composite structures (common dome) manufacturing technology development. Keeping the annual spending on the level of the past two years (2M), the following recommendations for program use within the next two years could be made jointly by P&VE and ME:

a. Use of Titanium for S-IC Thrust Structure, Fuel Tank, Intertank Shroud and S-II and S-IVB Forward Shrouds.

b. Use of Beryllium and Be-Al for Instrument Unit Structure and Cold Plates.

The Titanium use would account for about 25,000 lbs structural weight reduction being equivalent to about 1,850 lbs increase in escape payload. The Beryllium use brings a 300 lb structural weight reduction or payload increase. The cold plate program is further applicable throughout the vehicle and the spacecraft. The weight saving is not the sole payoff. Titanium 8Al-1Mo-1V, which was developed for the Air Force SST program, is more noble than high strength aluminum. It has "true" weldability and is not susceptible to stress corrosion cracking and overaging. It has highest compressive indices which account for the weight savings (30%) in compressively-loaded structures. The major deterrent in application of this high-efficiency material has been the lack of economical manufacturing processes. Burn-through welding and roll diffusion bonding are recent breakthroughs in producibility. In Beryllium, the brittleness had to be overcome by joining processes and Be-Al composites development. The SR&T program will provide the background for a structural state-of-the-art adjustment for second block redesign and/or engine uprating. E. Z. Gray recommended looking also at the S-IB the same way. FY-65 funding was offered for immediate additional support. ✓

NOTES 3-15-65 McCARTNEY B3/25

1. HUMAN RESOURCES: In implementation of the Human Resources Working Group chaired by Mr. Newby, DEP-A, R&D Operations has requested each Laboratory and Office to initiate a detailed review of its organizational structure and utilization of assigned manpower. This action is in response to the Admiral Rose study being conducted by NASA Headquarters. The study is designed to effect a self review at each major organizational level with a view toward effecting all possible economics through improved organization and personnel utilization. It will be tied in very closely with the PREP (Tabaka Study) exercise. All inputs from the laboratories will be reviewed and finalized by R&D Operations and forwarded to the Human Resources Working Group by April for inclusion in the overall MSFC submission to NASA Headquarters.

2. SATURN IB/CENTAUR MANAGEMENT PLAN: In support of IO's Saturn IB/Centaur Program Management, Mr. Palaoro has been designated as the official Operations Engineering Manager for R&D Operations. In addition an Engineering Manager will be assigned in each laboratory as the project focal point for actions concerning Saturn IB/Centaur. These representatives will coordinate Saturn IB/Centaur effort in the appropriate laboratory and in so doing, will be responsive to Mr. Palaoro. By this plan, a flexible and responsible management arrangement will be provided within R&D Operations.

3. SUPPORT CONTRACTOR PERFORMANCE EVALUATION SYSTEM: On March 4, Mr. Cook presented the performance evaluation system to the Administrator, who was well pleased. Mr. Webb has requested that a copy of the Procedure be furnished to the NASA Historian. The Performance Evaluation Boards, which will appraise support contractor performance, held their initial meetings last week, with Col. Fellows as Chairman. A representative from this office is serving as Secretary.

4. SUPPORT CONTRACTOR CONTRACT STATUS: All single support contracts are in NASA Headquarters for approval. The Sperry contract for ASTR and the Rust contract for Facilities and Design should be returned approved this week, with the remaining contracts being approved and returned prior to April 1. (It now looks as if the new contracts for R&D Operations will go into effect on April 1.) The new Conflicts of Interest clauses, agreed to during Mr. Cook's presentation of the four competitive single support procurements, will be incorporated prior to contract release.

Sperry was notified today that formal approval of their contract should be received from NASA Headquarters by March 18th, with an effective contract date of March 1, 1965. Thus, Sperry can proceed in making employment commitments to existing personnel; that will place Sperry in a competitive position with the selected single support contractors in other labs, who now are operating under existing support contracts.

NOTES 3/15/65 RUDOLPH B 3/25

1. S-IC-T Component Qualification Status - Reference Notes 3/1/65 Cline (copy attached). Your mid-Nov '64 meeting with Boeing on the S-IC-T (Lysle Wood, Stoner, etc.), was preceded by an internal MSFC meeting, at which time the S-IC-T component qualification problems were presented to you by Mr. Fuhrmann (& others) of P&VE. P&VE did not in that meeting mention a manpower problem (within P&VE) re the timely solution of the well known component qualification problems.

It is most "revealing", that three (3) months later (Feb '65), P&VE thru Mr. Weidner requested three (3) employees from Industrial Operations to assist in the cleaning-up of the component qualification of the S-IC-T.

Never-the-less, I agreed (within 1/2 hour after I received the request) to the release of three (3) employees requested for temporary duty for two (2) months to P&VE, two (2) of these people reported within two (2) working days; one (1) was not sent because of his involvement in 201, but a substitute has been sent by me.

Of course I had to pull these three (3) people from other critical areas in Saturn V, just to keep S-IC-T going.

It seems to me that this situation supports the observation that P&VE has not yet mastered the art of monitoring contractors technical performance in such a manner as to provide early identification of potential technical problems and further supports the observation that P&VE tends to divorce themselves from the contractor monitoring job and waits till the job becomes critical to the program (in order to justify performance of the job in-house).

That by the way is to my mind one of the underlying reasons why Mr. Kuers in his Notes to you often complains of the lack of components.

Recent statements by Mr. Kuers in a note to Mr. Weidner, re Instrument Unit manufacturing delays, further substantiates the above observations, quote..."Two major items are presently holding up assembly work at IBM: (1) cold plates which are manufactured by Avco on P&VE contract and which are rejected because of contaimination and (2) accumulators which are fabricated in-house and for which specifications from pressure tight welds to X-ray quality welds are changed by P&VE after completion of work in the shops. The situation is very much the same as in the S-IC stage: Engineering is not yet finalized or complete enough to support manufacturing schedules".

2. S-IC-501 Component Qualification Status - As you know there is also a critical situation on 501 concerning the timely qualification of vendor supplied components. In meeting this problem, Mr. Urlaub and Mr. Kuers have agreed that it will be mandatory to send MSFC and Boeing personnel to the vendors plants in order to assist them in providing qualified hardware for S-IC-1 on a timely basis. We plan to discuss this matter with Mr. Cline and request P&VE support in identifying these critical items, the vendor associated with them, and the P&VE technical personnel required to solve the problem.

This approach of solving the problem at the source, is a departure from the mode presently used, where "opinion" exchange meetings take place between MSFC Lab personnel and Boeing, that is rehashing the problem over and over.

Attachment: Notes 3/1/65 Cline (DIR, I-DIR, and R-DIR's copy only)

Eberhard Do you share this view? Reg what do you suggest? B

B 3/25

NOTES-3-15-65-SHEPHERD

OHL * I

S-II Complex at MTF: Last week the Mobile District Engineer, Corps of Engineers, notified the MTF Working Group that approximately $3.8M would be required to maintain the schedule and be ready to accept the S-2-T when it is to be delivered.

This week two groups are at the site to further investigate the situation. One group is to review outstanding changes to minimize the work remaining to be done on the pacing facilities. The other group is to review the construction procedures being used to determine if the fastest practical methods are being employeed on these important jobs.

We will continue an internal review here on March 22. If that shows a need to request additional funds we would plan to brief Mr. Lilly and Gen. Phillipps about March 25. ✓

OHL * III

Col. Barnett, Chief of the Facilities Projects Office, Industrial Operations: received word that he was to attend the Army War College. His reporting date is August 1, 1965. Col. Barnett joined us April 1963, primarily to support the facilities effort in the RIFT Project. He has, however, demonstrated such an outstanding capability that he was given the responsibility of the Facilities Projects Office upon the establishment of Industrial Operations. Although he will be an extremely difficult person to replace, I feel that we should make no attempt to retain his services by extending his tour of duty as this would certainly jeopardize his career with the Army. ✓

B 3/25

NOTES 3-15-65 Stuhlinger

1. PEGASUS DATA ANALYSIS: The flow of Pegasus data from GSFC STADAN stations is now regularized and 163 reels of data arrived for analysis this week.

Dr. Bisplinghoff and Milton Ames have requested a presentation in Headquarters March 17 on the usefulness of data retrieved thus far from Pegasus A in order to formulate a position relative to possible modifications or alterations to Pegasus B and C.

2. AES: Headquarters and U. S. Geological Survey people attended RPL'S review of the Bendix work on AES Scientific Mission Support Study this week and all agreed that this phase of the work was well done and a follow-on effort with Bendix should be developed.

The Lunar Science Symposium to be held at Marshall has had to be rescheduled from April 6, 7 and 8 to April 26, 27 and 28. Mr. Humphrey cannot attend.

3. QUARTERLY REVIEW OF OMSF SUPPORTING DEVELOPMENT: The first quarterly review of our supporting development was held March 10 and 11 with E. Z. Gray and his staff and visitors from MSC and KSC. In addition to helpful discussions on programming and funding procedures the agenda included technical presentations on C-1 Engine, Titanium Thrust Structures, Common Bulkhead Problems, Advanced Engine Design and AES.

4. ART/SRT PROGRAM STATUS:

	ANNUAL PLAN	AUTHORIZED	PROCESSED TO FMO	OBLIGATED
OART Total	14,062,000	12,549,000	10,722,523	3,309,770
MSF	20,000,000	16,000,000	15,459,779	4,067,123
OSSA	827,000	827,000	530,522	3,616
OTDA	1,925,000	1,925,000	1,124,464	927,585
TOTAL	36,814,000	31,301,000	27,837,288	8,308,094

The substantial jump in obligations this week of 3.8 M resulted from a few large items, i.e., C-1 Engine 1.529 M, J-2 Engine 1.0 M and other MSF items amounting to 1.216 M. In the OART programs only 59.45 K tasks were obligated and since the OART program is made up of many small items Purchasing's work continues to be critical.

March 22, 1965

NOTES 3-22-65 BELEW

B 3/26

F-1 ENGINE

The sixth and final pre-declared bomb induced instability test for Flight Rating Test Stability Demonstration was conducted on engine 025. The instability damped out in 25 milliseconds without hardware damage. The six bomb tests conducted on the FRT configuration injector yielded the following damp times: 34, 63, 97, 13, 81, and 25 ms. (The Model Specification maximum for FRT is 100 ms.)

The first flight engine (F-3012) was delivered to MSFC on Friday, March 19, 1965.

The fifth T-Stage engine (F-2009) underwent a successful 60 second test on Thursday, March 18, 1965.

RL10 ENGINE

Significant facts brought out at the RL10 Program Review last week are as follows:

1. The A3-3 revised pump design is exceeding expectations in in reducing NPSH.
2. Minimum performance of the A3-3 has been achieved. Work is in progress to achieve the specified nominal Isp of 444 seconds.
3. Thrust limits tests have indicated that there is sufficient design margin in the A3-3 engine to run it at a nominal thrust level of 17K. (Limits tests have gone to 19K steady state and 24K peak.)
4. The A3-3 test program is proceeding on schedule.

H-1 ENGINE

200K Engine qualification is continuing on Engine S/N H-7055. Eight of ten full duration calibration and gimbal tests have been successfully accomplished with no discrepancies noted. The second engine is scheduled to begin the qualification series on March 24.

C-1 ENGINE

Coordination meetings, relative to specifications and development plans, were held last week with MSC personnel preparatory to similar meetings with STL and RMD.

J-2 ENGINE

Dr. Rees and Colonel O'Connor visited Rocketdyne with me on Friday, March 12, and were briefed on the F-1 and J-2 programs. We also inspected the disassembled F-1 and J-2 PFRT engines.

Production engine J2015, for vehicle SA201, was accepted by the government March 15, 1965. Rocketdyne is presently incorporating engine kits as agreed to at the S-IVB review at Douglas Aircraft Company, Inc. Engine delivery is schedule for April 1, 1965.

The first S-II all systems engine, J2014, was accepted March 18.

A duration firing of the S-IVB Battleship was attempted at DAC/SACTO last Friday. The engine was cut off at 28 seconds when one of the two gas generator red line thermocouples became erratic. Details of the problem are unknown at this time. came unbonded - see James 3/22 Note

NOTES 3-22-65 CLINE

NEGATIVE REPORT

NOTES 3/22/65 CONSTAN

LABOR SITUATION AT THE MICHOUD PLANT

During the week of March 8, an unauthorized work stoppage (wildcat strike) developed at Michoud involving approximately 75 Chrysler employees and 200 Boeing employees. The work stoppage was not authorized or sanctioned by the respective unions. Disciplinary action was taken by both contractors, and all employees are expected to return by the first shift on Monday, March 22, 1965.

Fw 3/23

NOTES 3-22-65 DANNENBERG B 3/26

1. Experiment Coordination - Cryogenic Storage Zero "G" Test (MSC request). A meeting at MSFC with representatives from MSC, KSC, and MSFC is scheduled for 3-23-65, duri ng which MSFC will obtain the information necessary to determine the feasibility of the experiment. ✓

2. Manned Flight Readiness Criteria and Vehicle Go/No-Go Criteria - studies have been funded through NASA Headquarters. A presentation will be given by GE to MSFC in the near future outlining the proposed study scope and work accomplished to date. ✓

3. MSFC Preferred Parts Program - R-QUAL has taken the first step in establishing a Central Parts Management Group. This group will be attached to Mr. Grau's technical staff with Mr. Hamiter in charge, and will develop plans and procedures for the management of the overall MSFC parts program. ✓

4. Re Notes 3-1-65 DANNENBERG (Attachment 1) - Ground Abort 201, 202 - Joint Operations Group meeting was held at the Cape 3-17-65, under co-chairmanship of General Phillips and Mr. Christiansen. General Phillips brought up question of ground abort for unmanned IB flights under "other subjects." He indicated his intention to make a decision this week, but did not report full technical background. Dr. Speer and Dr. Kuettner sketched our position; so did MSC. Colonel James has informed Dr. Shea in writing about MSFC position which is essentially your own. - We advised against decision without full understanding of technical reasoning.

K.D. → Destroy launch vehicle and pad to save a lousy boiler plate spacecraft ?? How stupid can you get? B

P.S. The in-flight abort problem (whether there should be a separate spacecraft controlled cut-off command channel) has been decided in our favor.

FW3/23

NOTES 3-22-65 FORTUNE B 3/26

1. MTO Strike - Approximately 800 pipe fitters, plumbers, ironworkers, and carpenters were off the job Tuesday thru Friday in protest of a determination that cryogenic cleaning was non-Davis-Bacon work. This determination was made by the MSFC Labor Relations personnel prior to contract advertisement by General Electric. Paul Styles got an agreement Friday with the building trade to return to work, however, there are many details to be worked out by GE and MSFC personnel since the contract was awarded to Consolidated American on non-Davis-Bacon basis. ✓

2. The Field Activation Instrumentation Unit (FAIU Trailer) - has been accepted by NASA from MTSO which represents the first element of Technical Systems Phase Three which has been accepted at MTF. ✓

3. The S-IC Stage Storage Building - BOD occurred on March 15, 1965 and personnel of both stage contractors are now occupying the facility on a temporary joint-occupancy agreement. ✓

Tw 3/23

NOTES 3/22/65 GEISSLER B 3/26

1. Booster Recovery For S-IC: Re: Dr. Koelle's Notes of 2/8/65. It appears that the S-IC recovery concept recommended by Boeing may not be quite so simple as indicated, due to the following: (a) Hypersonic stabilization of booster is major problem since hypersonic retardation systems will not be available soon. Large fins proposed by Boeing would not provide necessary stabilization, and quite likely would collide with LUT on lift-off; (b) Attitude control system for coast phase through space has to be developed; (c) Development of cluster of four 120 foot parachutes for subsonic attitude control and deceleration will cause problems; (d) Use of LOX tank as hydraulic shock absorber has not been studied in detail. The five LOX lines, open on impact, would subject the engine area to hydraulic pressure.

E.G. Nevertheless, let's continue studies B

2. AES Experiments: A list is being made of choice earth orbital and lunar experiments which MSFC might want to develop. Selections are being made from the present MSF list of 84 earth orbital experiments chosen so far for the 15 AES earth orbital flights shown on the "K" schedule. Initial results of this effort will be presented to Dr. Rees and Mr. Weidner at a meeting on March 29, concerning our evaluation of the Headquarters proposal for a single Experiment Integration Center for all AES experiment packages for all flights (orbital and lunar). ✓

3. AES Funding: Guidelines we received from Hq. in the last weeks spell out clearly that FY-65 funds for AES should be considered Phase B of the "Phased Project Planning" document Dr. Seamans issued recently. Fy-66 funds in AES should be Phase C with FY-67 covering Phase D, i.e., the actual hardware contracts. They want Phase C to be finished July of 66. This will get us into a bad rat race since FY-67 budget is firmed up in Nov. 65 but the Final Definition (i.e., Phase C), spelling out the full detailed requirements in money, will be finished only in July 66. On top of this, Dr. Seamans usually does not release these kinds of funds until the third quarter of the fiscal year.

Exec. Staff FYI and comment B

4. Joint Operations Group: Phillips and Christensen cochaired the meeting at KSC on 3/17. Most agenda items were concerned with network support problems. MSFC (Speer, Kuettner) and MSC (Lunney) were requested to state their position on abort and cutoff command capability from the ground for SA-201. MSC insisted on both cutoff and abort command and stated that the MSFC proposed utilization of range safety command would not be acceptable to the range. Phillips refused to announce a decision in the meeting and stated that he would have additional discussions with MSC and MSFC and make his decision not later than the next Management Council meeting (3/23/65).

→ E.G. He did. Matter was decided in our favor. In other words, Phillips accepted the MSFC proposal. No separate "MSC cut-off trigger for 201" B

NOTES 3-22-65 Grau

B 3/26

1. S-IVB PROGRAM: Post manufacturing checkout of the S-IVB 201 stage progresses slowly due to part shortages. It is estimated that only 20% of post-manufacturing checkout on 201 will be completed at Huntington Beach.

2. S-IV PROGRAM: The S-IV-10 stage is presently in the Engineering and Development (E&D) Building at Sacramento. Post-Static checkout is complete, and the stage turnover meeting was held March 18, 1965. The stage will remain in storage in the E&D building until after launch of SA-8.

3. S-II PROGRAM: The Electro-Mechanical Mock-up (EMM) effort continues to fall behind schedule. All hardware has been delivered and rack-integration testing is underway. Many problems are being encountered in the incorporation of engineering changes and checkout verification. Considerable Laboratory manpower is being expended in direct, on-site support to assist S&ID in resolving these problems on-the-spot.

4. PEGASUS PROGRAM: The Electronic Canister for Pegasus B has completed acceptance testing at Bladensburg and was shipped to Hagerstown March 15. The canister is now being installed in the structural portion of the Spacecraft with final acceptance testing at Hagerstown scheduled to begin March 27, 1965.

5. RCA 110A COMPUTER: In recent weeks RCA's rejection rate on PC module nest wiring became alarmingly high. Two factors appear to have been primarily responsible: RCA quality control "running scared" and holding too stringent requirements; and five roving Air Force inspectors giving conflicting directions. Representatives of this laboratory assisting RCA and Air Force Inspection effected the following reductions in rejections: March 1 rejections approximated 85%, March 2 approximately 85%, March 5 approximately 34% and March 8 approximately 7.2%. Rejection for the first four hours of March 11 were at the rate of 1.1%.

NOTES 3/22/65 HAEUSSERMANN B 3/26

1. WEEKLY REPORT FROM IBM, OWEGO: On Friday, 3/19, Mr. Cooper reported about the clip fracture problem on the unit logic devices (ULD's). Delivery of the digital computer and data adapter system for preliminary checkout of 201 in QUAL will not be affected. We expect one to three weeks delay against the schedule previously quoted of systems for 201 flight, 500 FS and qualification testing; however, we hope that we can compensate for this lost time by a better phasing of the acceptance testing of the completed units. Special tests yield a dependable screening of the already manufactured ULD's (about 60,000) and of the assembled pages. It is not yet clear what has caused the dip-soldering fracture; manufacturing methods are being reviewed and improvements will be incorporated, especially to obtain easier inspection.

W.H. The clip shear, that introduced a torque! B (per IBM presentation) I fw

2. DELIVERY OF FIRST ST-124-M STABILIZED PLATFORM: The first ST-124-M stabilized platform was received from E/P, Bendix, 3/15/65. A preliminary visual inspection of the platform and examination of the E/P log book indicates improved gimbal performance and excellent workmanship. This first platform will be used for acceleration sled and other environmental qualification tests. The follow-on delivery schedule is one per month. We have no doubt that E/P, Bendix, can maintain this schedule.

NOTES 3/22/65 HEIMBURG

1. F-1 ENGINE:

Test TWF-054 was conducted on 3/18 on engine F-2009 for a mainstage duration of 60.87 seconds. One and one-half percent helium was injected into the fuel suction lines as a possible means of oscillation suppression. The preliminary data indicate only a minor reduction in frequency and amplitude. This was the last of the S-IC-T engines. Engine F-2010 will be installed on 3/22, and fired on 3/26.

2. S-IC:

A target date for 20% propellant tanking is Tuesday, 3/23. Engine installation will begin by the end of this week.

3. S-IVB BATTLESHIP (SACTO):

An intended full-duration firing was aborted on Friday, 3/19, at 30 seconds, due to GG combustor body temperature exceeding redline.

NOTES 3-22-65 HOELZER

Negative Report

CONFIDENTIAL

UNCLASSIFIED WH INCLOSURES ARE DETACHED

Jw 3/25

B 3/26

NOTES 3/22/65 JAMES

S-I-8: The S-I-8 gas generators and LOX purge lines were removed due to contamination found and they are being returned to Michoud from KSC for cleaning and reservicing. The components are expected back from Michoud late this week and no schedule impact is foreseen. ✓

PEGASUS SATCON FACILITY: Dr. Debus agreed last week that if MSFC deemed it in best interest of the program for SATCON to remain at KSC for SA-8/10, he would go along with keeping SATCON at KSC. A letter will be forthcoming from Dr. Debus on this subject. ✓

III Jw PEGASUS "B": During a series of meetings at Headquarters and Bladensburg from 3/12 through 3/18, OART and MSFC have agreed to all recommended changes on Pegasus B and C and the change to 70 volt bias on the detector panel will not be implemented due to time required for change. The latter will require Dr. Bisplinghoff's concurrence.

S-IVB GROUND COMMAND CUTOFF FOR UNMANNED VEHICLES: (MRAZEK) This subject was discussed at the Joint Operation Group at KSC on 3/17. General Phillips indicated he would study the problem and arrive at a decision today. A TWX was sent from Director's Office to General Phillips restating our position and urging caution in introducing systems which could provide false cutoff to a good R&D flight.

LBJ Was decided in our favor! Hope you have it writing by now. B

II Jw S-IVB BATTLESHIP: The full duration S-IVB battleship firing on 3/19 was cutoff after 29 seconds when GG body temperature exceeded redline value. Examination revealed over temperature resulted when thermocouple unbonded from GG body. ✓

SATURN IB ESE SCHEDULE SLIPPAGE: Ref. Haeussermann's 3/15/65 Notes. A meeting was held on this subject with Dr. Rees, Col. O'Connor, Mr. Weidner, Dr. Haeussermann and others on 3/19. The recommendation to establish a special task group to consider all problems related to ESE schedule was approved and a follow-up meeting with Dr. Rees is scheduled for 3/30 at which time results of actions taken will be presented. ✓

LBJ Please tell everybody that the "moved up" launch date set for 201 is the most important immediate milestone in the entire Apollo program. It should have first priority, even if the Sat V program suffers temporarily B

SA-201 SCHEDULE: Reference your comments on my 3/8/65 Notes. I believe we all appreciate that the 201 schedule has become critical, internally as well as externally. Since your comments were deleted because of classification, I believe at this late time it would suffice if you would repeat, hereon, your views on the 201 schedule in an unclassified version if you believe it appropriate to circulate to all recipients of Notes. See attached note to Dr. von Braun only.

SATURN IB/CENTAUR: Word was received from Headquarters over the weekend that MSFC has been assigned the Saturn IB/Centaur job as requested by MSFC and MSF. ✓

Attachment #1: Haeussermann's 3/15/65 Notes.
Attachment #2: Note to Dr. von Braun only.
Attachment #3: James 3/8/65 to Dr. von Braun only. (Classified)

CONFIDENTIAL

UNCLASSIFIED WHEN INCLOSURES ARE DETACHED

FW 3/23

B 3/26

NOTES 3-22-65 Koelle

1. Booster Recovery Experiments: We have completed a draft of a small document which presents eight booster recovery experiments ranging from drop tests of a 1/10 scale model of a Saturn IC Booster (costing a few hundred thousand dollars) to a full-fledged firing and turn-around of a Titan I booster (costing a few million dollars). To us a Redstone firing with recovery and refiring (done by Chrysler with surplus hardware) looks quite attractive. It costs a little more than one million dollars. Also, the firing of the leftover Little Joe II booster (at GD/Convair) with a tank - possibly manufactured here - looks quite good; we could test the recovery system proposed for the IC (pneumatic piston effect). This test is also in the one million dollar class. The optimum approach for us is selling the latter one to Ed Gray (Saturn supporting development funds) and the former to OART. We will route the document through channels to you, so that you can decide whether to propose this experimental program yourself to Dr. Mueller and Dr. Bisplinghoff. Some preliminary discussions along this line have been held with Headquarters staff people. You might remember that Ed Gray seems to be very much in favor of starting some experimental work in the booster recovery area.

2. Management Conference: Last week I attended a 3-day conference at the University of Pennsylvania (in the building where the first electronic computer, ENIAC, was built during World War II). I was the only NASA participant out of about 150. The following topics were discussed:

"The Evolution and Nature of Operations Research"
"A Survey of Applications of Operations Research"
"Organization and Administration of Operations Research"
"Operations Research in Long Range Planning"
"Systems Engineering - A New Concept"
"Systems Engineering - Implications for Management"
"Education for Systems Engineering"
"Automation of Management Information"
"Value Theory and Measures"
"Computers and Management"
"The Management of Computers"
"Computers and Automation: Impact on Society"

We had our share of good and bad speakers, but all in all it was a very valuable conference. It is amazing to note how fast the world is changing in these areas. We appear to be lagging; things move fast in the business world these days. They have no choice; adapt yourself or get out of business.

HHK (Chrysler Michoud)
Lovery told me that the Army plans to launch 20 de-activated Redstones in conjunction with an anti-missile-missile project. He thought we could easily combine our recovery test program with this and develop a joint Army/NASA program. Suggest you get in touch with Jons Lovery (and Gray) and develop an action plan if the idea looks feasible and attractive
B

Jw 3/23

NOTES 3-22-65 KUERS B 3/26

S-IC-501: The following steps have been taken to minimize schedule impact on 501 caused by undersupport of systems engineering:

a. We reviewed jointly with Boeing the ten (10) CAM's which have a most serious affect on our schedule for 501 in order to concentrate efforts on the most critical areas. This review resulted in agreements for advancement of documentation and parts delivery schedules. ✓

b. Rearranged our sequence of systems installation in such a way that most operations are shifted from vertical installation in Thrust Structure to horizontal installation at the final assembly period. To make this possible we will advance the container and structural fabrication in order to provide more time for horizontal installation. ✓

c. Mr. Urlaub conducted a meeting for review and re-classification of all committed and anticipated CAM's in order to eliminate the less important changes. Boeing Engineering (Mr. Dunnigan, Mr. Runkel, etc.) and R&DO Laboratories participated. This exercise resulted in deletion of some CAM's relating to TV camera installation on 501. ✓

d. In the same meeting we decided to stop the initiation of new CAM's by MSFC by not issuing any T.D. for 501 without prior approval by higher authority (Dr. Rees or yourself). ? WHY DIR ? Mrazek ! B

e. Special attention and effort is given to the component qualification program which is, in fact, in a very critical shape. Mr. Nelson has appointed special teams, consisting of numbers from design engineering, manufacturing, and quality control. These teams will move out and stay with the vendors until the task is accomplished. They will report directly to one man appointed by Mr. Nelson. ✓

f. Hundreds of parts are now being manufactured from sketches for 501 at Seattle and Wichita. Plant Number 1 in Wichita (owned by The Boeing Company) is now being utilized for this purpose because of a more R&D type organization of the plant which provides for greater flexibility and shorter flow times. ✓

g. In planning our work in the shops we investigate all possible "work around" methods by use of substitute designs, making dummy installations, and out of sequence operations. Where we see payoff's we work night shifts, overtime, Sundays, etc., improvise tooling, and make many organizational short cuts to obtain timely decision whenever new problems arise. ✓

NOTES 3/22/65 MAUS

RUSH

1. AES EXPERIMENTS - The short deadline set for accomplishment of the NASA/DOD Apollo-X MOL Study has considerably accelerated the definition and planning processes on AES within NASA. As a result, the selection and definition of Earth Orbital Experiments has progressed to the point that MSF now is faced with the problem of obligating FY65 study funds on studies relating to development and integration of experiments. We have made an exhaustive investigation into this subject and made a presentation to Dr. Rees, Mr. Weidner, etc., on March 17 on "The Possibility (And Extent) of MSFC Participation in AES Experiments Development and Integration." The basic question was "What would be the MSFC response to the following requests from MSF: (1) Proposal on an MSFC plan for management of an Experiments Integration Contractor and Facility; (2) Review and investigation by MSFC of the SAT IB/V and S-IVB/I.U. capability to carry selected Earth Orbital Experiments; and (3) Proposals by MSFC on any of the 84 Earth Orbital Experiments, MSFC would desire and/or be capable of managing the development contracts. The first two requests are official, and the third is informal, but extremely important. Action has been implemented on all three requests. Any Center proposals on this subject will require your review, since they relate to the basic question of "What is MSFC's future role?" Prior to review of these proposals, we can either make available to you copies of charts used in the presentation or repeat the presentation for you.

H.M.,
I'm greatly interested in hearing this story myself. Can you lay it on for March 29?
B

URGENT

2. NASA-WIDE MECHANIZED POP - A meeting, attended by MSFC, KSC, and MSC was held at MSF on March 16 to discuss the requirements of a format and a system for mechanizing the development of POP's. The Executive Staff presented to B. Johnson, MSF Program Control, a "dummy" POP with SAT-IB data proposing a format and a mechanized system developed internally by MSFC. MSFC's proposed system with modifications was accepted and will be used as a basis to implement a NASA-wide mechanized procedure for POP 65-3 and subsequent reports.

3. APOLLO COST STUDY - Deadline for submission of the Apollo Cost data was extended to April 1 and coincides with the date imposed on the prime contractors by the Cost Study Team. In addition to our present exercise, AES/MOL Study Team requested MSFC to provide estimates of recurring costs (additional GSE, tooling, facilities, etc.) required to attain variable production rates for SAT-IB and V vehicles. Development of this data will be integrated with our current Apollo Cost Study efforts.

I just gave him a copy. BH 3/29
H.M.
I'd like to see it B

4. STATEMENT FOR CONGRESSIONAL RECORD - The Teague Sub-committee requested, through Capt. Freitag on March 16, that you submit a statement for the record covering the background of MSFC programs, Center development and general management activities. The statement was delivered to Capt. Freitag on March 22.

Fw 3/23

NOTES 3-22-65 McCARTNEY B 3/26

1. OVERTIME POLICY: In carrying out Center policy of managing overtime use within tight limits, all R&D Operations organizational elements have been issued overtime allocations. For the remaining months of FY-65, the overall overtime ceiling will be reduced by planned increments of 1%, from a March level of 8% to the target level of 5% in June. Individual laboratory requirements for overtime exceeding these levels will be reviewed at the R-DIR level and adjustments made where possible within the total R&D Operations allocation. ✓

2. STATUS OF FY-65 SATURN PROGRAM: The status of the FY-65 Saturn program, as of March 18, 1965, is as follows:

	PLAN	INITIATED	BALANCE
Saturn I	$ 14.7	$ 14.2	$ .50
Saturn IB	34.8	26.46	8.36
Saturn V	131.5	114.4	17.1

Taking into consideration actions that are now in process, it appears reasonable to expect that approximately $12 to $15 million of the remaining balance will be initiated by the March 31 Center established deadline. The remaining $10 to $12 million should also be obligated by the end of the fiscal year for short lead time items such as propellants and program stock. Another possibility for proper utilization of remaining funds will be forward funding of the Single Support Contracts through July 31, one month beyond the present fiscal year. ✓

fw 3/23

B 3/24

NOTES 3/22/65 RUDOLPH

Negative, except - Too many meetings (PSAC, Management Council, Apollo Program Managers Meeting, etc.) and reviews (Position Review and Evaluation Plan - PREP, Human Resources Review, etc.).

Very little time left to manage the Program. !!

FW 3/23

NOTES-3-22-65-SHEPHERD

B 3/26

No Notes

NOTES 3-22-65 Stuhlinger

1. PEGASUS A: To date we have received 445 tapes from STADAN stations through GSFC. They are analyzed jointly by Computation Lab and RPL. Tapes received through our Green Mountain Station continue to be extremely valuable for us, not only because of immediate availability, but also because the tape quality is sometimes much better than that of other stations.

A very productive meeting was held between members of OART (including M. Ames), Fairchild-Hiller, and MSFC, on Pegasus data evaluation, and on desirable modifications for Pegasus B and C. The occasional high counting rate of some panels appears to be caused by a "sputtering" of those panels shortly before shorting. Remedies of this defective panel property are presently worked out; they will be introduced by the Project Office.

2. LUNAR SCIENTIFIC PLANNING: A new Lunar Scientific Planning Team will be formed under the direction of OSSA. This team will be responsible for all scientific experiments to be conducted on the lunar surface as well as in orbit. It is currently being planned to dissolve both the Apollo Scientific Planning Team and the LESA Panel. This seems to be a consolidation effort to provide one central scientific governing body. Final conclusions as to how this team will be formed have not been resolved but surely some of the current panel members will be retained. It seems that OSSA is greatly interested in strong MSFC participation in the lunar scientific program.

3. DR. KURZWEG VISIT: Dr. Kurzweg (Director, Research Division, OART) will visit this Center on March 23 and 24 for detailed discussions of the research tasks under his cognizance. Members of P&VE, Comp, Astrionics, Aero-Astro, ME, and RPL will give presentations. RPL (G. Miles) is coordinating the meeting.

4. TESTING OF THERMAL CONTROL SURFACES ON SATURN SA-8: Dr. Shea, MSC Apollo Office, requested us to include thermal control surface samples on SA-8 and SA-10. Discussions with NAA representatives and with the Pegasus Project Office led to the result that a NAA sample will probably be flown on SA-8.

5. RESEARCH ACHIEVEMENTS REVIEW: The next review will be held on March 25th at 9:00 in the Morris Auditorium. It will cover Cryogenic Technology, and Liquid and Solid Propulsion Technology. We regret that P&VE has found it necessary to classify the meeting "Confidential".

March 29, 1965

fw 3/29

B 3/29

NOTES 3-29-65 BELEW

S-IVB ULLAGE ENGINE - ROCKETDYNE/GEMINI

Hot-firing (650 seconds total on-time) on the first MSFC Qual engine was successfully completed March 24, 1965. The TCA chamber will be sectioned for detail analysis. Qual is being conducted at MSFC.

H-1 ENGINE

200K engine qualification is progressing satisfactorily. The first engine (H-7055 an outboard) has completed eleven calibration tests for 1,560 seconds and is currently undergoing safety limits and malfunction testing. The second engine (H-4055 an inboard) has completed seven calibration tests for 1,085 seconds.

Contamination was discovered in three of the gas generators on the SA-8 engines at KSC last Thursday. All eight gas generator assemblies were removed from the vehicle engines and flown to Michoud for recleaning. Reinstallation on the vehicle is scheduled late this week with no schedule impact. Source of the contamination could not immediately be identified.

RL10 ENGINE

The assembly cycle has been started for the first of five prototype RL10A-3-3 (Uprated Specific Impulse) engines to be delivered near the end of this year. Two of these prototypes will be flown on an experimental Atlas/Centaur Flight (AC-9).

Testing at P&WA has shown that the use of a larger boost pump recirculation line on the Centaur stage will eliminate the "geysering" problem that was encountered on Centaur vehicle AC-4.

F-1 ENGINE

Delivery of the thermal insulation cocoon (portion above the F-1 engine thrust chamber throat) is in jeopardy. Recent tests indicated possible failure modes when operating at our spec requirements relative to flight dynamic pressure loads. No significant impact is expected at this time, based on the assumption that improvised insulation for the "T bird" can be provided.

In order to minimize impact, a reassessment of the criteria (established October 1964) including the recent model testing at Lewis will be made in an attempt toward relaxing the requirements.

J-2 ENGINE

The recommendation by MSFC to MSF to construct a new J-2 altitude stand on Cocoa-IV instead of Delta-I has resulted in Dr. Mueller's questioning the need for the engine stand.

LB
Action?
B

The duration firing on the S-IVB Battleship that was cutoff at 28 seconds (last week's notes) was due to one of the two (two for redundancy) gas generator thermocouples malfunctioning. Due to a missing fuse in the ground power circuitry, the engine repeatedly tried to start again when attempting to reset the control circuitry.

It looks like the engines for 201 and 202 will be delivered on or before the schedule established in the SIVB Quarterly Review. Certain operations at Rocketdyne are in an around-the-clock schedule to further minimize the J-2 schedule impact on SIVB and S-II.

L.B.
Don Douglas told me on March 28 that the J-2 was the pacing item of SIVB and that from the reports he got he was gravely concerned.
B

B 3/29

NOTES 3-29-65 CLINE

Lee James FYI B

1. INTERFACE CONTROL DOCUMENTATION (ICD): Discussion with Chrysler Corporation Space Division (CCSD) concerning their preparation of the Saturn IB fluids ICD's has revealed that they cannot obtain data from Douglas Aircraft Company (DAC). It appears that CCSD's responsibility in the Systems Engineering area has not been clarified to other contractors. This will cause a schedule problem with the release of the level "A" and the level "B" ICD's.

Lee James FYI B

2. S-IVB SYSTEMS DESIGN TEST AND CHECKOUT REQUIREMENTS: The need for Systems Design Test and Checkout Requirements (SDTACOR) for the S-IVB Stage, Saturn IB/V, is becoming extremely acute. Requirements have been placed on DAC, however, as of 3-25-65 only 20% of the documents have been delivered. This response has not been satisfying. It is reiterated here that MSFC must have SDTACOR for the S-IVB Stage in order to discharge its responsibilities under NPC 500-10, Apollo Test Requirements, and to provide a prime input and common baseline for the establishment and review of ground support equipment requirements, test procedures, operations planning, fluid requirement definitions, and other activities.

3. S-IC-T PROPULSION SYSTEM COMPONENTS QUALIFICATION STATUS REPORTED: Status of 76 components is as follows:

52 - acceptable
6 - acceptable for loading tests only; must replace before firing
2 - replacment required - available
7 - unacceptable pending further information
1 - not used on S-IC-T
1 - minor modification required
1 - rejected
6 - inoperative due to "work-arounds" ✓

NOTES 3/29/65 CONSTAN

B 3/29

1. STATUS OF S-I-8 - Gas generators and purge check valves for engines mounted on vehicle S-I-8 were received from Kennedy Spacecraft Center to be disassembled and checked for contamination. The preliminary findings are as follows:

Lee Below

FYI

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a. Generator for engine H-5020 had excessive amount of Dow Corning Lubricant FS-1281. The lubricant was found on the bottom side of the LOX poppet.

b. Generator for another engine had metal chips in the control port.

c. No contamination was found on generators for engines H-5019 and H-5021.

d. A particle count was taken on the check valves for four other engines and was found to be within limits.

2. VISIT OF NASA-DOD Launch Vehicle Panel, Aeronautics and Astronautics Coordination Board

On March 24, 1965, ten members of the NASA-DOD Launch Vehicle Panel of the Aeronautics and Astronautics Coordination Board visited MSFC/Michoud Operations. Mr. Milton Rosen was the senior NASA panel member. The group, accompanied by Mr. Hans Hueter, was given an orientation briefing and tour of the Michoud complex.

NOTES 3-29-65 DANNENBERG

1. EXPERIMENT COORDINATION

Experiments for SA-205 were finalized by the Executive Secretary Working Group on 3-22-65 and transmitted to MSC for review.

Experiment for SA-207 will be finalized at the next MSF Experiment Board meeting on 5-17-65. Experiments proposed by MSFC (1) Dielectric Evaluation of Materials, (2) Thermal Control Coating Evaluation, (3) Establishment of Propellant Mass, and (4) Liquid Interface Stability were referred to the Apollo Program Office (Mr. Abernethy).

Discussions between MSFC and MSC on 3-23/24-65 resulted in the agreement that the Subcritical Cryogenic Storage experiment could be flown on SA-203. MSC agreed during the meeting to change the fluid from LO_2 to LN_2.

2. S-II COMPONENT QUALIFICATION PROGRAM - A quick response estimate to MSFC's proposed stage component qualification program revision has been received from S&ID. The cost estimate is so outrageously high, it appears the current qual test program will have to remain unchanged. The planned test program for mechanical GSE on the other hand appears very promising from a cost standpoint during early negotiations. Complete incorporation at satisfactory cost is anticipated.

3. S-IVB - Critical Design Review on SA-201 is scheduled for 4-13/15-65 at DAC. Stage coordinators will identify sub-systems to be reviewed and the levels of documentation required. The Stage Manager will coordinate with DAC to secure any additional documentation needed.

4. CONFIGURATION MANAGEMENT - Draft procedure to control changes being submitted by R&DO elements to IO stage managers has been prepared. This will be discussed for compatibility with Dr. McCall's System Study.

R&DO will participate in Configuration Management briefing scheduled for 4-12-65.

Study initiated on the approval cycle of MSFC standards since these have an effect on contracts and change control. Currently standards are released without action on the part of R-DIR.

R&DO change coordination procedure has been implemented in support of the S-IVB and Engine Project C.C.B.'s.

Tue 3/29

B 3/29

NOTES 3/29/65 FORTUNE

1. Visitors - Eric Neubert reviewed our growth ten days ago. Al Siepert from KSC was in Monday after a local speech and the NASA/DOD launch vehicle panel was here Wednesday. Rosen was quite impressed with our progress and the other panel members all wanted to come back when we were operational. E. Z. Gray questioned our being ready to fire the S-II-T in January, based on other test stand experiences and activation problems. He said he would talk to Lilly about helping with whatever funding might prove necessary. Hueter accompanied the panel.

2. Electricians delay striking - The Gulfport local threatened to strike Wednesday unless General Electric promised them electrical maintenance work. Gilstrap, IDEW Business Agent, said that the pipe fitters won their maintenance agreement the preceeding week and he wanted the same. He agreed to wait until Styles came back to talk it over. Such a strike would be secondary boycott and we could get a prompt court injunction. While any delay will hurt the S-II Test Stand, I feel we should hold firm against a Precedent Maintenance Agreement for MTO and Styles should make this position clear to all Building Trades.

3. A Systems Analysis Team consisting of ATF Associates (I-MT, GE, and S&ID) and the MTF Working Group - was convened at Mississippi Test Facility to complete and end — to-end chart of construction. The Systems installation, GSE installation, and activation of the S-II A-2 test complex and necessary supporting facilities are in preparation for further status reviews.

4. Atlanta Air Force and MSFC Quality Assurance Personnel - were here in regard to obtaining DOD Quality Assurance Personnel to be utilized during activation of the Mississippi Test Facility.

5. GE Company authorized staffing level increase - Authority to increase the negotiation FY-65 staffing level by approximately 20% was granted to meet the initial accelerated needs in critical areas. Further reviews are being held continuously to insure capability of GE/MTSO to respond to requirements without undue contractural or administrative red tape locally.

B 3/29

NOTES 3/29/65 GEISSLER

1. SA-8: Re: Notes Geissler 3/15; item 4. We have been informed by Dr. Johnson's office that 9 deg/s roll with an associated 1.6 deg/s tumbling rate in pitch and yaw are acceptable for Pegasus B. These new tolerances are based on a re-evaluation of the Fairchild-Hiller Corporation structural analysis taking into consideration the impingement effect of vented gas on the wings. These rates are compatible with a maximum LH_2 residual of 250 lb (also used for SA-9). The equal probability for not exceeding 250 lb LH_2 and for achieving guidance cutoff will be approximately 95%. The S-I fuel bias will be again 1,850 lb. This provides a 99% probability for LOX depletion as requested by P&VE for a more refined evaluation of S-I propellant utilization. Payload optimization would result in a lower fuel bias (approximately 650 lb). However, the gain is not required for the SA-8 mission. ✓

2. Guidance and Performance Sub-Panel: The tenth G&P Sub-Panel meeting is scheduled for March 29 - 30, 1965, at MSC. Agenda Items are: (1) Discussion of the SA-202 L/V and S/C Reference Trajectories and combining of these documents into a joint MSFC-MSC SA-202 Reference Trajectory document; (2) SA-201 Guidance Equations; (3) Status report on SA-206 (emphasis on LES/CSM jettison characteristics); (4) Saturn IB Elliptical Orbits; (5) Status of Saturn V Mission Planning Work; (6) Review of Action Items. Item #(5) is a follow-up action to Saturn V Direct Ascent Studies which were discussed at the last Management Council Meeting. ✓

3. Alternate Mission Planning and Engine Out Capabilities for Saturn IB and V: Extensive joint effort has been underway for approximately one year, by both the prime contractors (TBC and CCSD) and inhouse personnel, to investigate the feasibility of incorporating the requirement for engine out flight in the ground rules for the Saturn IB and V vehicles. Results have shown that there is a distinct advantage in being able to continue flight after an engine failure, in that in some cases the primary mission can be completed, an alternate mission may be selected, or, greater lattitude is allowed in the selection of abort modes and recovery areas. The goal of these analyses has been to determine what capability for engine out flight exists in the design of the present vehicle, and/or what changes are required to provide engine out capability for failures occurring at various flight times. It is presently anticipated that a meeting will be held on May 6, 1965, to present you, Mr. Weidner and others with the results of these analyses. It is hoped that a decision can be made at that time on whether or not the Saturn vehicles (S-IC, S-II and S-IB stages) should be designed for engine out.

E.G. Please move to another date since I'll be out of town. I am greatly interested in this subject and have a few suggestions of my own on how to widen these studies B

kw 3/29

B 3/29

NOTES 3-29-65 GRAU

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1. F-1 ENGINE PROGRAM: F-1 Engine 2010 completed receiving inspection and has been delivered to Test Laboratory. There were no major discrepancies. This engine completes receiving inspection of the six S-1C-T engines. A summary of all discrepancies for the six engines is being compiled so that action can be initiated to correct the repetitive defects.

2. QUALITY PROGRAM REQUIREMENTS STUDY: A member of this Laboratory represented MSFC in a meeting with Council of Defense and Space Industries Associations (CODSIA) representatives held at the Office of Reliability and Quality Assurance, NASA Headquarters. CODSIA representatives are to conduct a study of NASA quality program requirements and compliance methods utilized by industry in order to determine any recommendations which can be made to NASA for achieving quality objectives at reduced cost. Conduct of the study will include visits to several NASA installations, including MSFC and contractor facilities. It will begin in April 1965 and recommendations are to be made to the NASA Headquarters Office of Industry Affairs in September 1965. This will not be an evaluation of NASA organizational or operational effectiveness.

3. DEFENSE CONTRACT ADMINISTRATION SERVICE (DCAS) QUALITY SUPPORT: A representative of this Laboratory attended an instructors training conference on Defense Supply Agency Manual 8200.1, "Procurement Quality Assurance Program for Contract Administration Services," conducted at Defense Contract Administration Headquarters, Cameron Station, Alexandria, Virginia. This is the program to be used by DCAS personnel when performing quality assurance functions for NASA. The conclusion was that the provisions of this program, if properly complied with by an adequate number of DCAS personnel, can provide assurance of quality, provided NASA delegations are made in accordance with NPC 200-1A and close coordination is maintained between NASA and DCAS quality assurance personnel.

4. PEGASUS: Final checkout of the Pegasus Prototype under ambient conditions is nearing completion at Hagerstown. Shipment to General Electric, Valley Forge, Pennsylvania for checkout under more stringent environmental conditions is expected to take place early this week.

NOTES 3/29/65 HAEUSSERMANN

1. ESE ASSESSMENT TEAM: (Reference Item 3, Notes of 3/15, Copy Attached*) During a meeting with Mr. Rees, 3/20, to review schedule conflucts of 500 FS, 201 IU, 201 ESE, causes of ESE schedule slip**, and possible remedial actions were discussed. Mr. Rees requested that a detailed assessment of the ESE situation be made. The assessment is to include details of status, current and anticipated problems, steps taken and planned to minimize schedule slip and resulting impact on SA-201. An assessment team was established, 3/23, co-chaired by Messrs. Noel and Jones of my staff. Membership of the team includes personnel specializing in ESE activities in IO, Quality, and Astrionics; it will meet daily with GE to identify specific problems causing ESE delays and to develop possible corrective actions. An ESE problem status board will be developed jointly by the team and GE and will be maintained by GE at their facility. Problems posted on the status board and documented in detail on an ESE assignment sheet will be assessed in detail by a specific individual for corrective actions. The problem resolution will be defined on the ESE assignment sheet, reviewed by the assessment team, and turned over to a team member or GE for immediate implementation of corrective action. Status of all Saturn IB ESE being delivered directly by ASTR will be documented by Electrical Systems Integration Division and assessed in detail by the team to assure compatability with overall ESE schedule requirements. EPSCO Inc., GE principal subcontractor for IU ESE, is considered to have limited capability for anticipated volume of fabrication work**. To overcome this problem, GE has taken steps to subcontract an amount of the fabrication work with Sperry Farragut. The available capacity at Sperry Farragut is adequate to satisfy the GE and our own single support contractor requirements.

2. ACOUSTIC QUALIFICATION TESTING OF RCA-110-A COMPUTER: The 110-A computer and periphery equipment has been successfully qualified to operate in an environment where the total sound pressure level is 140 db. (Reference 0.0002 dyne-cm) The acoustic qualification test was performed at the Wyle Laboratories, Huntsville, during the week of 3/22/65. A frequency spectrum from 50 cps to 2000 cps which duplicates the expected Saturn V Launch Complex 39 acoustic profile was used during the tests. Successful operation in the 140 lb. sound pressure level provides a 10 db safety margin for computer operation within the mobile launches of Complex 39.

3. WEEKLY REPORT FROM IBM, OWEGO: Mr. Cooper, IBM, reported being now only 10 days behind on flight hardware because of the ULD clip-soldering fractures. This delay is based on using new, not reworked, components and does not include anticipated gain in time during checkout. No single cause for the ULD failure has been found. It is IBM's opinion that the fractures are mechanically induced; thus all possible steps have been taken to improve mechanical tools and burn-in methods are being checked. I am not satisfied with the progress and a team including Mr. Angele and Dr. Pschera will visit the Components Division of IBM next week for a thorough review.

* Copies to DIR and R-DIR only.

** As reported in referenced note.

NOTES 3/29/65 HEIMBURG

1. SATURN V HOLDDOWN ARM: On 3/22, a second Saturn V holddown arm failed structurally while undergoing a preload test. (REFERENCE NOTES 3/1/65 HEIMBURG, COPY ATTACHED.)

The upper link of the arm failed at a preload of approximately 425,000 pounds. At the time of failure no upload (thrust) or download (rebound) was applied or had been applied to the holddown arm. The test criteria calls for the arm to be preloaded through a range of 0 - 1,000,000 pounds.

After the first failure occurred, the broken piece was sent to the P&VE Lab for analysis. A full report is not yet available; however, indications are that the material was defective. Microscopic cracks were found to be distributed throughout the casting and yield and ultimate strengths were considerably lower than design values.

KSC personnel are redesigning the upper link. Meanwhile, load testing of the holddown arm has been suspended and testing will be restricted to the pneumatic release system sequencing test.

2. S-IC: Performed stage components check, leak test and propellant tanking. Propellants were tanked to approximately 15%. Leak checks were made with propellants onboard and the tanks pressurized.] Inside the lox tank was inspected and it as well as the suction lines were found to be exceptionally clean considering the size of this vessel. The engine holddown arm and stage aft compartment firex system were flushed. [Two engines were attached at stage positions 1 and 2.]

3. F-1 MSFC: Engine 2010 was successfully fired for 60 seconds on Friday, 3/26/65. This engine will be placed on S-IC-T instead of 2009 as planned.] (Detailed analysis of 2009 data showed an unprecedented drop in thrust with time during 60 second S-IC-T "qualification" firing at MSFC. Engine 2009 will be returned to the STTW for further investigation of this problem.) Helium was injected on the fuel side of 2010 up to 2% by volume and seemed to have a more oscillation suppressive effect on this engine than on 2009.

4. S-IVB BATTLESHIP (SACTO): Three unsuccessful attempts were made to fire for full duration on Friday, 3/26/65. First attempt was aborted by failed engine safety circuit and last two by stage problems LH_2 NPSH and LH_2 prevalve.

5. S-IB-1 MSFC: A second propellant loading test will be made today, 3/29/65, to get data which was missed on last Thursday, 3/18/65. Short firing will be Thursday, 4/1/65.

6. S-II BATTLESHIP SANTA SUSANA: Ignition test of cluster planned for Thursday, 4/15/65, to verify satisfaction of engine start conditions.

ATTACHMENT: NOTES 3/1/65 HEIMBURG, COPIES TO DR. VON BRAUN AND MR. WEIDNER ONLY.

B 3/29

NOTES 3-29-65 HOELZER

1. GENERAL-PURPOSE TWO-MAN COCKPIT SIMULATOR

A general-purpose cockpit simulator structure has been received and installed in Building 4663. It was procured with research funds and will be used with general purpose computers and visual simulation devices for studies of manually controlled vehicles. Initial operation for manned simulation studies of MOLAB and reusable boosters is expected within the next three to four months. These studies and simulator preparations are being jointly planned with Astrionics, Propulsion and Vehicle Engineering, and Aero-Astrodynamics Laboratories.

This cockpit structure was designed and fabricated by The Boeing Aero-Space Division at Seattle, Washington. It features a modular concept in that instruments, controls, seating, windows, and the enclosure can be readily altered for representation of different vehicle configurations or concepts.

2. EQUIPMENT: In the Notes on March 8, 1965, (Copy attached) we mentioned the purchase of the IBM 7094 computer systems. The purchase orders have been made up and forwarded to MSFC Purchasing Office. At the present time, the only problem preventing the consummation of the project is that the funds have not been sent down from Headquarters. However, it is believed that these funds will be available by the time the purchase orders are completed and ready to go out. The reasoning behind buying 7094's at the presenttime is that, even though the Computation Laboratory feels that third generation equipment is less expensive and more processing for your computer dollar, by the time the Laboratory is able to get third generation equipment aboard the IBM 7094's will have paid for themselves in rental.

3. FACILITIES: The extension to Building 4663 has been completed and completely occupied by the personnel assigned. At the present time, however, the air-conditioning system has not been accepted.

4. STRAPPED-DOWN PLATFORM COMPUTER STUDY: A study is underway in the Digital Simulation Section in support of Astrionics Laboratory to evaluate different equipment and programming approaches to the coordinate transformations required in a strapped-down guidance system. Particular emphasis is being placed on incremental, or digital differential analyzer, implementations which are readily simulated on the TRICE-440 system.

Attachment: Hoelzer 3/8/65 Notes to Dr. von Braun only.

Jw 3/29

B 3/29

NOTES 3/29/65 JAMES

STAFFING AND PERSONNEL ACTIONS: We have received information verbally that the Saturn IB/Centaur management assignment has been given to MSFC. We are, therefore, taking preliminary steps toward separating Reinartz and a few other personnel as a nucleus of the new office in accordance with the understanding for this assignment. It is not our intention to have a rapid buildup in Reinartz' new office but it is considered necessary that an identifiable element be established as soon as possible. It will also be necessary that I attempt immediately to replace Reinartz and a few of the key people involved in this transfer in order that the Saturn I/IB will not suffer from this new assignment. It appears to me that for personnel reasons alone, MSFC may not be equipped to take on a new assignment such as this. Reinartz must staff a new organization and I must restaff the losses. However, it seems to me that personnel actions toward staffing the old organizations have been at a virtual standstill for more months than I can remember. I am still trying to promote stage managers obtained 18 months ago and for whom promotions have been attempted ever since. I have a staff office headed by a GS-12 that I have been trying to promote for 18 months to a GS-13 and even at the secretarial level, my own secretary is 2 grades below the job alloted and I have been unable to promote her for many months. If Reinartz and I attempt to solve such problems as these, there will certainly be no time left for project management.

CENTAUR SCHOOL AT GD/C: Based on an invitation from General Dynamics/Convair, 33 engineers from MSFC attended a two-day school on Centaur at GD/C on March 18-19. Included in the attendees were 6 IO personnel and 27 R&DO personnel (R&D Engineering Manager and 5 laboratory project engineers).

S-IB-I: Current plans are to have the short duration static firing on March 31 and the long duration firing on April 13. ✓

GROUND ABORT COMMAND FOR UNMANNED SATURN IB MISSIONS: (MRAZEK) General Phillips has accepted the MSFC position on Ground Abort Command for Unmanned Saturn IB Missions. ✓

S-I-8: Three of the gas generators which were sent to Michoud last week for cleaning and reservicing because of contamination were returned to KSC on March 26. The remaining 5 gas generators are being returned to KSC today and no schedule impact is foreseen. ✓

cut off here

Eberhard, Harry

Suggest the three of us discuss item 1. I think some drastic action is warranted. We can't go on like this, now that we have the IB/Centaur safely secured!

B

this note appears only on Dr. von Braun's, Mr. Rees', and Seamans' copies.

Fw 3/29

B 3/29

NOTES 3-29-65 Koelle

1. CENTER PLANNING: We were very pleased by the reception we received last Friday in the Executive Board meeting. We think that the discussion was rather constructive and we will proceed in the direction the Board indicated. In detail, we plan to do the following in the near future:

a. Refine Center preferences as to the direction in which we want to evolve our activities, and how fast,

b. Refine selection criteria for Center projects by another iteration (poll key people), using better definitions, which should leave little room for misinterpretation, and by pitting potential project against available talent.

c. Test bookkeeping procedure, which correlates project cost, project penetration, and required manpower,

d. Compile relevant Center statistics and trends,

e. Have another discussion with the Executive Board late in May and give a new status report.

f. Simplify logic diagram by eliminating "obviously-out" solutions, and by emphasizing "obviously-in" solutions. x)

2. MANNED PLANETARY TRANSPORTATION SYSTEM STUDY FILM: We have now obtained a copy of the GD/Convair (K. Ehricke) film on "Manned Interplanetary Missions," which you expressed a desire to see (reference: NOTES 3-1-65 Koelle). B

Please arrange with Bruns

B

x) With this I do not mean to preempt the conclusions. I simply mean that we shouldn't "shuffle meaningless paper ballast thru the logic" on things that are preordained facts for the management of MSFC. B

1 Attachment:
NOTES 3-1-65 Koelle

fw 3/29

B 3/29

NOTES 3-29-65 KUERS

1. Lox Tunnel Welding in Fuel Container for S-IC-501: All five Lox Tunnels have now been successfully welded into the Fuel Container for 501. These Lox Tunnel welds are the most difficult welds to accomplish for the entire S-IC structure. The major problems were inaccessibility for clamping and alignment, welding in an oblique plane an elliptical weld seam, joining a forged material to rolled or flow turned material, and welding a gage thickness for which the control of the time-temperature relationship is most critical. We had realized that our previous Tunnel welds on -T and -S, using the TIG welding process, were not yet satisfactory because of excessive porosity requiring many hand repairs. Boeing went thru the same experience at Michoud in their welding development laboratory and in welding the Tunnels in -D. Because of the inconsistent and unreliable results of this technique, Boeing has already redesigned this joint, replacing this weld by a bolted flange connection, to be effective on 504. In order to produce the best quality weld possible for the first flight stages, we made an all out effort to develop a new welding technique using the MIG welding process which allows us to weld with a much higher welding speed. We designed and built a new welding machine in-house and developed this technique within three months, working seven days a week on this problem. We are very glad to report today that this effort has now resulted in a much higher quality weld for 501 than we were able to achieve before. ✓

2. Lox Outboard Pressure Volume Compensators for 501: The design fix for the PVC deflection problem has been agreed to between Arrowhead and P&VE. The estimated schedule impact on 501 production hardware is approximately a four weeks slippage. These major components, determining the sequence of assembly in the Thrust Structure to a great extent, are now three months in delay. ✓

Matt Urlaub

Suggestion?

B

NOTES 3/29/65 MAUS

B 3/29

1. HEADQUARTERS SURVEY OF FORM 533 - Dr. Seamans has directed the implementation of a Survey of Usage of Form 533, used for contractor financial management reporting. Mr. Hilburn has appointed the headquarters team for this study, headed by Doug Burrows. The team plans to come to Huntsville to interview MSFC personnel during week of April 5-9. We recommend establishment of an MSFC counterpart team to coordinate the MSFC position and contacts. We are preparing an announcement for your signature to establish the MSFC study team.

2. BOEING S-IC COST AND MANPOWER REVIEW - The Boeing S-IC Cost and Manpower Review is one week behind schedule, but is expected to be completed by the June 1 target date, A plan has been prepared and members are being indoctrinated March 29-30. The across-the-board review begins Wednesday, March 31, at Michoud. IO has gone all out to place capable people on the survey team.

H.M. Do we not start all procs again? B

3. HUMAN RESOURCES SURVEY - We learned unofficially Friday (from Keith Wible) that the NASA Committee on Human Resources Survey, headed by Admiral Rose, is to be dissolved; it has been determined that this study can best be accomplished through the line organizations of NASA Headquarters.

4. GENERAL MANAGEMENT PROGRAM REVIEW - Dr. Lange will represent you at the March 30 Administrator's (General Management) Program Review of Aeronautics and Space Vehicle Programs. MSFC attendees for the March 31 (repeat) session will be: Dr. Lucas, R-P&VE; Dr. Dozier, R-RP; and Mr. Murphree, R-AERO.

5. MSFC REQUIREMENTS FOR WSMR SUPPORT - In response to a request from White Sands Missile Range for long range planning information we have completed a survey to determine MSFC's requirements for support by WSMR during the 1965-1974 time period. A letter stating negative requirement will be forwarded to WSMR this week.

6. EXCEPTED POSITIONS - We received an urgent inquiry last Thursday from MSF for data on all existing and proposed Excepted, Super Grade, and PL 313 positions. The information submitted included the number of (1) technical and non-technical organizational elements, and (2) personnel by each grade above GS-12, that report to each person above GS-15 at MSFC. The information was to be submitted by MSF to the NASA Salary Board for use in evaluating the Centers' and NASA's current and proposed use of Excepted Positions.

Tw 3/29

NOTES 3-29-65 McCARTNEY B 3/29

1. INITIATION OF FY-65 R&D OPERATIONS FUNDS: In the 3-22-65 NOTES, it was reported that approximately $25M of the Saturn R&D FY-65 budget remained to be initiated. A very drastic reduction has been made in that total during the past week. As of close of business March 26, Procurement actions had been submitted to bring our un-initiated balance to: (in thousands)

SATURN I	SATURN IB	SATURN V
$195	$3,600	-$210 (overdrawn)

The above figures are the results of an intensive effort by all the Laboratories to identify this requirement by the end of March, to comply with Mr. Gorman's fiscal policy. It is also the result of a very closely coordinated effort with IO and FMO in reprogramming among accounts to assure that our final requirements were matched by dollars, including the 210,000 deficit shown under Saturn V. The above figures do not include money set aside for this purchase of materials, supplies, and propellants for the remainder of the fiscal year.

2. WORKLOAD AGREEMENTS BETWEEN IO AND R&D OPERATIONS: In accordance with your Policy Memo, " R&D Operations and IO : Charters & Guidelines for Cooperation", dated Feb. 19, 1965, representatives of R-RM and I-RM have been actively engaged in developing procedures for work to be performed for IO by R&D Operations in specific packages, mutually agreed upon in advance. This action has to date developed a general approach with a supporting draft MSFC Regulation which is being staffed with all concerned. In addition, detailed procedures which will revise our present method of budget management have been drafted and will also be staffed, as required. These procedures, when finalized, will form the detailed basis for agreement between Mr. Weidner and Colonel O'Connor for R&D Operations Support to IO.

FW 3/29

B 3/29

NOTES 3/29/65 RUDOLPH

1. Saturn V Systems Engineering and Integration Support Contract (SE&IS) - A presentation on the SE&IS effort being performed by Boeing, the types of data required by Boeing from other contractors, and procedures to be used by Boeing in obtaining this data is tentatively planned for April 22, 1965, with the concerned Industrial Operations Project Managers (Stage & Engine) and their contractors. An in-house presentation is planned for the Project Managers prior to the meeting with the contractors.

The Second Quarterly Review for Boeing SE&IS effort is scheduled for Tuesday, April 27, 1965.

2. S-II Battleship Stage Status - The S-II Battleship Stage GSE and engines have been completely installed and are presently being checket out. First cluster testing is expected to be accomplished on April 15, 1965, as scheduled, using flight type LH_2 prevalves. The flight type LOX prevalves will be installed after first test due to late delivery.

3. S-II Stage All-Systems Test Program - We are currently implementing an S&ID Master Program Schedule which includes the transfer of the All-Systems Program from Santa Susana to MTF. This is in accordance with the plan presented to you and NASA Headquarters. (still questioned by FEM!) B

4. Launch Vehicle Digital Computer/Launch Vehicle Data Adapter (LVDC/LVDA) Development Program - The first Aerospace Systems Test and Evaluation Console (ASTEC) was shipped from IBM Owego on March 24, 1965. This is a significant milestone in the computer and data adapter development program in that it marks successful completion of an overall systems marriage of the computer and the data adapter and the systems test equipment.

5. RCA 110A Computer - The RCA 110A Computer passed all Acoustical tests without failure. Three complete tests were conducted at 130 db level without failure. Computer was then taken to 140 db level, also without failure. The Computer is being moved to a new location in Wyle Laboratory plant for vibration tests.

Tw 3/29

NOTES-3-29-65-SHEPHERD B 3/29

S-II - MTF: (Reference NOTES 3-15-65-SHEPHERD, copy attached) The present official schedule for the S-II at MTF is for the S-II to arrive at Mississippi in September 1965 and be placed on the stand in October 1965. After stage and stand checkout and tanking test approximately two months would remain for all-systems testing prior to arrival of S-II-1 on March 15, 1966. The Corps of Engineers' assessment is that the S-II facility has slipped four weeks and have requested and been given approval to use $3.6M to maintain the adjusted schedule and prevent further slippage. The net result is that the all-systems firing time will be limited to four weeks in February. General Welling, U. S. Army Engineering Division, South Atlantic, will visit us on March 31, to discuss the situation at MTF. There are a number of areas where we need to have the Corps strengthen at the site. General Phillips will be briefed on the situation this week.

S-IC-4: (Reference NOTES 3-8-65-SHEPHERD, copy attached). The S-IC-4 is due at Mississippi in February 1967, the present schedule for the test stand is to be completed by August 1966. Prior to testing S-IC-4 the S-IC-T will be utilized to check out the stand beginning in September 1966. While this is a tight schedule, I believe with the present frame of mind in Washington it would be inadvisable at this time to further discuss with Dr. Mueller testing of the S-IC-4 at Huntsville. The maximum effort at Mississippi will be placed on the S-II complex with as much effort as possible on the S-IC complex consistent with the priorities. If in several months it appears necessary to bring S-IC-4 to Huntsville for testing to maintain the schedules, I think it would then be appropriate to discuss with Dr. Mueller again.

Sleep I did, but I didn't get very far! So you are probably right. B

FY-66 CofF Budget: We may expect some cuts in the FY-66 CofF Budget. As you know the committee has singled out several projects at Huntsville, among which is the Non-Destructive Testing Laboratory for Dr. Lucas, for particular criticism. While we do not know the extent of the cuts that may be made, Bill Lilly believes that no specific line items will be cut as was done in FY-64. Rather a percentage cut will be made in the CofF Budget. The percentage cut is the preferred way in that it gives us the flexibility of deciding which projects to reduce or delete.

2 Attachments (Dr. von Braun's copy only)

Tw 3/29

B 3/29

NOTES 3-29-65 Stuhlinger

1. PEGASUS A: Dr. Seamans has requested a briefing on the status of Pegasus data analysis during his scheduled meeting with Drs. Mueller and Bisplinghoff Arpil 8 and 9. We will prepare the material and the presentation. ✓

E.S. I think Johnson + you + Dozal should give the briefing B

2. ART/SRT PROGRAM STATUS: Of 31.3 M authorized in OMSF, OART, OSSA and OTDA for FY65 for ART/SRT Programs, 30.2M or 97% was committed to FMO by March 26. So far, only 8.845M or 28% have been obligated. ✓

3. SCIENTIFIC WORK AT MSFC: As this Center's research program manager, I am exposed to an experience which gives me increasing concern: This is the fact that MSFC members on the Division Chief and Branch Chief levels find less and less time to devote to the preparation, formulation, technical supervision, evaluation, and utilization of research work. Likewise, they find almost no time to keep in touch with the fast progress of science by reading journals, attending scientific conferences, participating in discussions, or even doing a little studying of their own. Their competence in scientific matters, and their ability to penetrate the work under their supervision in some depth, deteriorates rapidly. Instead, they find themselves entangled in endless Tabaka studies, PREP exercises, Rose manpower reviews, detailed budget forecast exercises, and the like, or they are continuing their frustrating and luckless fight to obtain a GS-15 for a senior scientist (Ph.D.) with 10 to 30 years of professional experience, many publications, an excellent record of successful contributions to the Redstone, Jupiter, and Saturn Programs, and a handful of other scientists under his supervision. RPL alone, at the present time, has five cases of this nature. Each MSFC Lab has some. Regardless of how eloquently we profess our love and our need for scientists, unless we are serious about improving the environmental conditions, this Center will lose scientific work, for its competence in the scientific field very rapidly. This is particularly unfortunate at the present time at which MSFC'S involvement in AES and other Saturn-related projects of a scientific mission type is not only imminent, but almost unavoidable. Never before in our Center has scientific competence been of such a great and immediate need and utility for the Center program. Two parallel steps toward improvement are evident: (1) A relief from the fast growing bureaucratic burden which besets Lab Directors, Division Chiefs, and Branch Chiefs; (2) A better recognition of the worth and the status of the creative scientific worker at MSFC, to be expressed by higher grades available for senior scientists, and by better on-the-job training opportunities available for junior scientists.

I believe that this situation deserves the attention of our top management.